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Indian Administrative Service Examination

GENERAL KNOWLEDGE

Paper 1959

Time allowed—Three hours

Maximum Marks—150

*Candidates should attempt all questions
The number of marks carried by each question is indicated
at the end of the question*

Answers must be written in English

*Marks will be deducted if the length of the answer to a question
exceeds the limit specified in the question*

*Candidates must write the correct number of the question and
sub-question before writing their answers. Failure to do
so will entail loss of credit for the answer*

*Parts of the same question must be answered together and
must not be interposed by answers to other questions*

Each question must be started on a fresh page.

Q. 1. 'Gandhiji's goal was a classless society, but he was not a Marxist.' Explain in about 250 words. 15

Ans. Hindu society since ages has been divided into castes and innumerable sub-castes. This has divided the whole Hindu nation into tight divisions due to which intermarriage and even interdining is a near impossibility. This has been the greatest cause of our weakness as a nation and of dissensions among us. The higher castes look down upon the lower castes with disdain, so much so that the lowest ones are regarded as untouchables who may never aspire to hold positions of honour and profit and must always remain as a submerged part of the Hindu society. It is these divisions and subdivisions against which Mahatma Gandhi raised his voice. He wanted the Hindus to do away with all these class and caste distinctions and be one people where all enjoy the fundamental rights granted by the Constitution without any distinction of colour, caste or creed. There would thus be no untouchable, no high caste Brahman or Kshtryia, Rajput or non-Rajput. All would be equal and meet as equals, and dine and intermarry as one Indian people. Hindu society would thus become a classless society.

et he was not a Marxist, for he did not believe in
 ie and the ruthless and violent suppression or exte
 of higher or propertied classes which is the creed
 sts. According to him all must live—high and low
 enrich society by their intellect and their sup
 ts, except that big landlordism and vested int
 fe believed in mixed economy and not in suppre
 for the sake of the other.

Q. (a) What are the ideals, as set forth in the Preamble, for which the Constitution of India stands ?

4

(b) When can the President of India proclaim an Emergency ?

6

(c) Name the zones into which the States of India have been grouped and mention the States included in each zone.

5

Ans. (a) The ideals as set forth in the Preamble to the Indian Constitution are :

1. To constitute India into a Sovereign Democratic Republic in which the ultimate authority both in the Centre and its various federating States rests with the people.

2. All citizens of India without any distinction of caste, colour or creed shall enjoy full :

(i) Justice in all spheres : social, economic and political.

(ii) Liberty of thought, expression, belief, faith and worship.

(iii) Equality of status and of opportunity, and

(iv) Fraternity, assuring the dignity of the individual and the nation.

(b) The President can proclaim a state of emergency :—

(i) when he is satisfied that there is danger to the security of India or any of its part is threatened either by war or internal rebellion.

(ii) when on receiving a report from the Governor of a State or otherwise, he is satisfied that the Government of the State cannot be carried on according to the Constitution.

(iii) when the President is satisfied that there is a danger to financial stability or credit of India or any part of it.

(c) The following are the zones into which India has been divided :—

1. **The Northern Zone.** Punjab, Rajasthan, Jammu and Kashmir, Delhi and Himachal Pradesh.

2. **The Central Zone.** Uttar Pradesh and Madhya Pradesh.

3. **The Western Zone.** The Bombay and Mysore States.

The Eastern Zone. West Bengal, Bihar, Assam, Manipur and Tripura.

The Southern Zone. Madras, Kerala and Andhra Pradesh.

3. (a) Select any five of the following books, authors and explain their importance, in a few words each :—

- (i) The Prince.
- (ii) Akbar Nama.
- (iii) Uncle Tom's Cabin.
- (iv) The Origin of Species.
- (v) Anand Math.
- (vi) The Wasteland.
- (vii) Dr. Zhivago.
- (viii) India Wins Freedom.

10

Ans. The Prince. This book published in 1532 was written by Niccolo Machiavelli, famous Florentine writer and statesman. The book gives an objective, scientific analysis of the methods by which political power is obtained and kept and why it is lost. He saw the weakness of the Italian states, especially of Florence, badly armed and torn by factions and this convinced him that the need of the hour was for a strong and united government. Believing that the times were corrupt and men's actions were prompted solely by self interest, he advocated in this book that there should be a single strong ruler whose interest it should be to promote the welfare of his state. In his choice of means, such a prince must set aside considerations of morality and be guided only by the end in view.

(ii) Akbar Nama. This was a book written by Abul Fazl, courtier of Akbar, wherein he describes the court of Akbar, the various courtiers and the positions they held in the court and gives also a valuable detailed account of the reign of Akbar and his administration.

(iii) Uncle Tom's Cabin is a novel by Harriot Beecher Stowe in which he has drawn a lurid picture of slavery as practised in the U.S.A. before the civil war. The chief figure in the novel is the faithful old slave Uncle Tom. His old master Shelbys sells him to an easy going, good natured St. Clare where he has a good time, but he is next sold to the brutal Simon Legree who treats him with great harshness which leads to his premature death. The story is very pathetic.

(iv) The origin of species. This is a famous scientific treatise by Charles Darwin published in 1859, in which he

first promulgated his theory of evolution. According to his theory offsprings can vary from the parents and become stronger. He tolerates only the *survival of the fittest*, the principle of natural selection can explain the evolution of a higher species from a lower one.

His book also discounts the Biblical story of God sending Adam and Eve to earth, and shows how the highest species were evolved from the lowest ones.

(v) **Anand Math.** This is one of the most famous novels of Bankim Chander Chatterji which has for its setting the early period of the British in India. In it Chatterji has given us the great patriotic song the Vande Matram.

(vi) **The Wasteland.** This is a long poem by T. S. Eliot. As described in the poem, the wasteland is a sterile area, blighted by a curse, where crops do not grow and the fisher king there is sexually impotent. Release from the spell can be secured only by a knight's coming to the castle and asking about the meaning of the various symbols it contains. In the poem physical and sexual sterility are thus made to symbolize with the spiritual sterility of the 20th century.

(vii) **Dr. Zhivago.** This is a Russian novel by the Russian author and Nobel Prize-winner Boris Pasternak, depicting conditions in Communist Russia of today. The story around which the novel is built is that of Dr. Zhivago's life in which he went more and more to seed, gradually losing his knowledge and skill as a doctor and writer and who, from his scale of depression and resuming his activities only falls back, after a short flare up of these activities into long periods of indifference to himself and to everything in the world.

(viii) **India wins Freedom.** This book printed posthumously and edited by Humayun Kabir, is from the hands of late Maulana Abul Kalam Azad. The Maulana traces the activities and the part played by Congress leaders in the freedom struggle till the dominion status was attained. It also describes how agreement was forced upon the Congress leaders for partition of the country into India and Pakistan in spite of Mahatma Gandhi's earlier declaration that he would never agree to the division of the country and Maulana's criticism on it and of some of the Hindu leaders like Sardar Patel.

(b) With which of the Arts do you connect the following?—

- (i) Epstein, (ii) Mrs. Rukmini Devi Arundel,
- (iii) Cezanne, (iv) Onkar Nath Thakur,
- (v) Chopin, (vi) Ashit Kumar Haldar,
- (vii) Frank Lloyd Wright, (viii) Prithviraj Kapoor, (ix) Cecil B. de Mille, and
- (x) Anna Pavlova.

- (b) (i) Epstein. Sculpture.
 (ii) Mrs. Rukmani Arundale : Bharatnatyam dance.
 (iii) Cezanne. Painting.
 (iv) Onkar Nath Thakur : Classical vocal singing.
 (v) Chopin : As composer and pianist.
 (vi) Ashil Kumar Haldar : Painting, specially wood-painting.
 (vii) Frank Lloyd Wright : Architecture.
 (viii) Prithviraj Kapoor. Cinema and theatre.
 (ix) Cecil B. de Mille. Film production.
 (x) Anna Pavlova : Ballet dancing.

Q. 4. (a) Why did the Nagpur session of the Congress resolve in favour of Co-operative farming? How does Co-operative farming differ from Collective farming? (Above 200 words.)

10

(b) Mention some of the ways suggested recently to mobilize resources for the Third Plan of India (About 60 words.)

5

Ans. It is a well known fact that Indian agricultural production suffers, among other things, from fragmentation of holdings and non-co-operation among even neighbouring farmers and that they seldom pool resources as do people in advanced European countries like Denmark. It is to remove such types of shortcomings in agriculture that Congress passed the resolution for Co-operative farming in the country in its Nagpur session in January 1959. The idea underlying this resolution is to carry out a national agricultural programme based on large-scale farming by helping to abolish petty and fragmented holdings, and pooling of resources and thus providing incentives for more agricultural output.

This Co-operative farming differs from collective farming in this that in the former, pooling of resources and of collective farming is on purely voluntary basis, in the latter, the farmers have to pool their resources and do collective farming under state compulsion. This is the Communist way of farming. In the former case the individual farmer is a perfectly free agent owning his land, which he can till separately at will, but this is not the case in collective farming where the farmer surrenders his individuality and his free option.

(b) The resources for the Third Five-Year Plan fall under the four main headings

1. Taxation
2. Internal borrowing

3. Deficit financing

4. Aid from friendly countries from abroad, like aid in machinery, technical skill and long term loans that have been for the 1st and the 2nd Five-Year Plans. It comes mostly from U.S.A., but Commonwealth countries like the U.K., Canada, Australia and New Zealand and also West Germany are expected to give us a helping hand, while long term loans for running projects like the building of more and more steel plants may be got from the U.S.S.R., etc.

Q. 5. (a) Where are the following situated, and why are they famous or important ? (About 25 words each.)

- (i) Barauni, (ii) Sarnath, (iii) Nagarjunakund, (iv) Hawaiian Islands, (v) Cyprus, (vi) The Kuro-Siwo, (vii) Lebanon, (viii) Johannesburg, and (ix) Pompeii. 9

Ans. (a) (i) Barauni. Town where an oil factory is to be built shortly.

(ii) Sarnath Place near Banaras, known for Buddhist temples and remains. It was in the Deer Park at Sarnath that the Buddha gave his first sermon and the first batch of disciples joined him who proved to be the nucleus of Buddhist church or order.

(iii) Nagarjunakund. A great pilgrim centre of the Buddhists in the Guntur district of Andhra State. The place was built by Nagarjuna, an ancient prince and an ardent devotee of the Buddha.

(iv) Hawaiian islands. These are a group of 20 islands in central Pacific held by the U.S. since 1900. U.S.A. joined the 2nd world war when the Pearl Harbour here was suddenly attacked by the Japanese.

(v) Cyprus. It is an island in the east Mediterranean. It came into world news in recent years on account of the struggle of the Cypriotic Greeks to oust the British, who were in possession of the island, and the civil war with the Cypriots of Turkish origin. The chapter of agitation closed when the British granted it self rule.

(vi) Kuro-Seivo. This is a warm ocean current of the Pacific. Like the famous Gulf Stream of the Atlantic it flows north east ward going to east of Formosa and Japanese archipelago.

(vii) Lebanon. It is a small republic in south west Asia. It sprang into world news when during 1958 there was a civil war in the country, the rebels being secretly aided by the U.A.R. and fought against their government during the Presidency of Mr. Chouman. The rebellion came to an end when Gen. Saheb came to the helm of affairs.

(viii) **Johannesburg.** This is the city of South Transvaal in the Union of South Africa. It is the industrial centre of the famous Witwatersrand.

(ix) **Pompeii.** A town of ancient Italy at the foot of mount Vesuvius. It was buried by a great eruption of Vesuvius in 79 A.D and it was not till mid 1700's that it was rediscovered. The Forum, an amphitheatre, temples, theatres, public baths, private houses of rich and poor etc. have been excavated.

(b) Explain the following, in about 40 words each :—

Trade winds, Neap tides, Magnetic Poles of the Earth.

6

(b) **Trade winds.** These are more or less easterly tropical winds blowing over the oceans from high pressure belts (called the Horse Latitudes) towards the low pressure doldrums at the equator. Our monsoons are trade winds.

Neap Tides. These are very low tides, which occur when the sun and the moon are at right angles.

Magnetic poles. The earth like any magnet behaves like a magnet and has two magnetic poles—i.e., surface points where magnetic force is vertically downwards. The north magnetic pole is near 70° latitude and 100°W in the north, while the south magnetic pole is near latitude 73°S and 148°E.

Q. 6. (a) What are the principal products of—

- (i) Churk, (ii) Bhilai, (iii) Titagarh, (iv) Kulu, (v) Guntur, (vi) Bhagalpur, (vii) Kuwait, (viii) Coolgardie, (ix) Java and (x) The Ruhr ? (One or two words each.)

10

(b) Explain the working principle of any two of the following :—

Radar ; Telephone ; Cinema ; Seismograph ;

Air-conditioning. (About 60 words each)

5

Ans. 6 (a)

(i) Churk. Cement

(ii) Bhilai. Steel

(iii) Titagarh. Paper

(iv) Kulu. Apples

(v) Guntur. Tobacco

(vi) Bhagalpur. Erandi—Silk

(vii) Kuwait. Mineral oil

(viii) Coolgardie. Gold.

(xi) **Java.** Quinine, rubber, sugar, teak, taffee, rice etc.

(x) **The Ruher.** Coal, steel, machinery, chemicals.

(b) **Radar.** The working principle of this device for detecting an object in space or of a ship on sea is as follows :—

A highly directional beam of short duration is transmitted by a transmitter. There is an arrangement for the wave concentration and a beam directing antenna which receives the beam reflected back upon hitting the object. There is next an arrangement of an indication (which usually consists of cathode ray tubes that act as radar screen). The target is found by revolving the antenna to the direction of the strongest radio echo or by synchronizing cathode beam to revolve on the screen in conjunction with antenna so as to show the target bearing. Reception in time lag of two antennae varying in height gives the target altitude.

Telephone. This is the system of transmitting sounds (speech for example) over long distances by means of electric impulses in a wire.

Its working is as follows :—

As one lifts the receiver of a telephone the circuit is closed. Next, speaking into the mouthpiece causes the delicate aluminium diaphragm of the microphone to vibrate in response to the sound waves of the speech, as does the human eardrum in the ear. The diaphragm moves a piston that presses against small grains of carbon. When the grains are tightly packed they convey an electric current more effectively than when loose, hence the current in the wire is controlled by their compression. The vibrations of the granules of carbon disturb the magnetic field of a nearby bar magnet inducing an electric current in a thin copper wire wound about the magnet. The current upon reaching the distant instrument causes its diaphragm to vibrate by similarly fluctuating the nearby magnetic field. The electrical wave gets converted to sound waves and thus the original speech is heard at the other end.

Cinema. The cinema is nothing but a series of still pictures produced by continuously projecting them on a screen by means of a film. These images are photographs of objects at successive instants of motion projected so rapidly that the eye perceives them as in continuous motion.

It is to be noted that though the pictures are still, the whole show seems to move continuously forward without any break because the vision of a picture takes atleast one tenth of a second to fade from the mind, while the next picture in the cinema comes sooner before the eye, so that there is perceived no gaps between the successive pictures.

Seismograph. This instrument records the motions of the ground produced by earthquakes. Its working is as follows :—

A weight is supported by a vertical spiral spring. When the ground moves in a vertical direction the weight remains stationary and the spring is extended slightly. The motion of the weight relative to the frame of the instrument operates a system of levers and scratches a mark on a piece of smoked paper carried on a rotating drum. Thus the earth tremor is detected and recorded. Since there are frictional forces on the recording points they are eliminated by photographic recording.

Air-conditioning. This is the system used for the internal climate of a building. Its working system is as follows :—

Fresh pure air is drawn into a room required to be air-conditioned through filters. The filtered air is then washed by forcing it through a water screen so that it is absolutely free of dust or smoke particles. It is next heated or cooled, upto the temperature required by a heating or cooling arrangement (like that of a refrigerator) and its humidity is adjusted.

Q. 7. Write explanatory notes on any five of the following :—

- (a) Rickets ; (b) Heart-lung machine ; (c) Vaccination ; (d) Natural selection ; (e) Atomic powered submarine ; (f) Blood group ; (g) Cybernetics. (About 40 words each.) 15

Ans. (a) Rickets. This is a serious disease in children causing curvature of the bones due to softening. It is due solely to the lack of vitamin D, which disables the child from properly absorbing calcium and phosphorus.

Treatment consists of sun baths. Halibut or cod liver oil rich in vitamin D, may be administered with advantage.

(b) Heart-lung machine. This is a newly constructed machine based on intensive medical research. It is used for heart surgery. During the operation, the patient's blood-circulation is temporarily exteriorised through the machine, by-passing the heart which is left empty and idle, enabling the surgeon to work deliberately by direct vision without risk of severe haemorrhage. The heart-lung machine, besides artificially circulating and oxygenating the patient's blood, can also cool it if hypothermia is necessary.

(c) Vaccination. This is a protective inoculation against smallpox by introducing cowpox (vaccine) virus into the skin.

(d) Natural Selection. This is a process which enables plants and animals with certain inherited traits to survive better than some others. Those individuals or species which

cannot adapt themselves to their environments, die out in the struggle for existence.

(e) **Atomic powered submarine.** This new type of submarine, like the Nautilus, built in 1955 by the U. S. Navy has an engine which consists of a thermal reactor, water coolant, and geared turbines. The powerful submarine reaches a speed of 20 knots under water.

(f) **Blood group.** This term means section of people distinguishable by differences in their blood, blood characteristics enabling such distinctions to be made. There are four types of blood groups, called O, A, B, and AB. The serum of group A will agglutinate the cells of a person of group B and vice versa. The cells of group O person will not agglutinate in contact with any serum; those of group AB person will be agglutinated by serum from A or a B person. These four blood groups have great importance in blood transfusion and may be of use in cases of disputed paternity. [There have been cases where children born at nearly the same time in a hospital were stealthily exchanged. The blood group of the child at once discloses who is the real mother.]

(g) **Cybernetics.** This term was recently coined by Norben-Wiener for the field of machines combining the features of electronic calculating machines and servo-mechanism. These devices are capable of collating stored data and information that they accumulate by their own observation, then making predictions and "decisions." It is believed that the human mind is a such like extremely elaborate and refined cybernetic device.

Q. 8. Write about 100 words on each of the following :-

- (a) Recent happening in Tibet.
- (b) East-West differences on Germany.
- (c) Canal Waters Dispute between India and Pakistan.

15

Ans. (a) Tibet has been a semi-independent country, with China claiming a suzerainty over it. This suzerainty Tibet was made to recognize when the Communists came to power and they had to surrender to China the defence and external affairs of the country, just as the British treated the native states in India. But like new converts to a faith, the Chinese began to interfere in the internal affairs of Tibet and to indoctrinate the people. They put all sorts of hindrances on the movements of the Dalai Lama and all the other Lamas and at many places even demolished the Buddhist monasteries and distributed lands on the Communist pattern. This aroused widespread resentment in the country, but like the Indian Mutiny spark to the dry powder came when the Dalai Lama was asked by the Chinese Governor

to attend a festival function. The people fearing that he would be detained and held under duress, formed his bodyguard and made him escape from the pursuing Chinese to India. The Khampa tribesmen broke into open rebellion and have been ruthlessly suppressed though with great difficulty.

(b) The problem of Germany is the re-unification of the country, now divided into the Federal Republic of West-Germany and the German Democratic Republic of East Germany. Both the West and the East agree on this but there is no agreement on the methods by which this is to be brought about. The West wants that there be a plebiscite in both the parts of the country, supervised, say by the U. N., and the united country should choose the type of Govt. it wants. The U.S.S.R. opposes this idea, because West-Germany with its overwhelming majority would sweep the polls, and the United Germany will be nothing better than the West-Germany of Dr. Adenauer, with its sympathy and alignment with the West. It wants that (i) East Germany be recognized as a separate sovereign state and the two states should make a mutually agreed settlement (ii) There should be a mutual European security pact in which the U. S. A., the U. S. S. R. and re-united Germany participate ; thus Germany be taken out of the N: A. T. O. while there be limitation and inspection of forces in Germany. There has been no agreement on any one of these points as yet.

(c) **The canal water dispute.** In this dispute India has always insisted that she must have the perpetual right to use all the waters of the rivers Sutlej, Ravi and Beas which flow through East Punjab, while Pakistan should have the right to use the waters of the Chenab, Jhelum and Attock. India has also agreed to give Pakistan assistance for the construction of alternate means of supplies to the canals now fed by the eastern rivers ; also that during the transitory period India would continue to supply water to Pakistan from the eastern rivers.

At first Pakistan would not agree to the exclusive use of the three East Punjab rivers to India, but insisted that India must first agree, before Pakistan agreed to any or whole of the proposals, that she must not merely pay for the link canals, but even for the whole system of dams, reservoirs and canals that would have to be constructed for the development of the whole system of irrigation in W. Pakistan.

There was naturally a breakdown on this, as India would be saddled with a huge amount, while agreement on the exclusive use of the three rivers was not even first made. At last by the repeated and prolonged efforts of the World Bank the agreement was made, and now Pakistan will have assistance from the World Bank, some friendly western

countries and India and she concedes to India the right to use exclusively the three eastern rivers.

Q. 9. What do you know about the following ? (About 35 words each.)

- (a) Huen Tsang.
- (b) The Crusades.
- (c) The Third Battle of Panipat.
- (d) The Battle of Waterloo.
- (e) The two Partitions of Bengal.

Ans. (a) **Huen Tsang.** Chinese pilgrim who visited India during the reign of Harsh Vardhana and stayed in India for fifteen years (625-40). His writings of those days throw a good deal of light on the social, political and religious conditions of the people of those days.

(b) **The Crusades.** These were nine wars undertaken by European Christians between the 11th and 14th centuries to recover the Holy Land, particularly Jerusalem from the Muslims. The first crusade (1095-99) ended by the capture of Jerusalem. The second crusade ended in dismal failure. The Third got only the right of free access to the Holy Sepulchre. The remaining crusades ended almost all in failure till they were given up.

(c) **The third battle of Panipat.** This battle fought in 1761 on the plains of Panipat near Delhi, between the forces of Ahmad Shah Abdali and the Marhattas under the Bhao, led to the utter destruction of the Marhatta forces. The Marhattas lost all chances of building a Hindu empire in India and left the field clear for the British to establish theirs.

(d) **The Battle of Waterloo.** This memorable battle fought in 1815 at Waterloo in Belgium by the Anglo-Dutch troops under Wellington supported by the Germans under Blucher on the one hand and the French under Napoleon on the other, is one of the most decisive battles of the world. It removed from the European scene the dreaded Napoleon and gave a dominant voice to Great Britain in European and world affairs and helped in the unrestricted expansion of the British empire.

(e) **The two partitions of Bengal.** The first partition of Bengal took place in 1905 under Lord Curzon. This was a great blow to the national solidarity of the Bengalis and undoing of the Permanent Settlement. It was resented by the Bengalees who agitated intensely against it, till King George V announced its annulment in the Delhi Durbar.

The second took place in 1947 according to the Radcliff Award by which East Bengal has been created into East Pakistan, while West Bengal has joined India.

Q. 10. Who or what are the following ? (About 25 words each.)

(a) General Abdul Karim Kassem.

(b) Umrigar.

(c) B. P. Koirala.

(d) Christian Herter.

(e) Prince Akihito.

(f) Swatantra Party.

(g) Diplomatic illness.

(h) Territorial waters.

(i) The Krémelin.

15

Ans. (a) Abdul Karim Kasem. Formerly general in the army of Iraq, he at the head of his insurrectionary force led a revolt against the monarchy, which resulted in the murder of King Faizal and other members of the ruling Hashmite family and the declaration of a republic in the country. General Kassem has become Prime Minister of the new state.

(b) Umrigarh. He is one of the most outstanding figure in Cricket in India. Has given good account of himself in many test matches.

(c) B.P. Koirala. When the late king Tribhavan of Nepal fled to India, Mr. B.P. Koirala led a national insurrection against the Rana regime till this regime was overthrown and a truce patched up. Mr. Koirala persistently opposed his brother, M. P. Koirala, who succeeded as prime Minister of Nepal and helped in his overthrow. He has now become the Prime Minister, his party having swept the polls in a general election.

(c) Christian Henter. Mr. Hurter has succeeded as the Secretary of State of the U.S.A. on the death of Mr. Dulles.

(e) Prince Akihito. The crown prince of Japan. He is the first crown prince of Japan, in Japanese history, who has married a commoner.

(f) Swatantra Party. This is a new political party of India brought about by the efforts of Mr. Rajagopalacharya, who is its founder member. The ideology of the party is that it stands for minimum government and minimum state interference, for minimum expenditure in administration and minimum regulation in industry and trade. It opposes the idea of co-operative farming and service co operatives, as these will lead ultimately to collective farming on lines of communist countries.

Diplomatic illness. If an ambassador or diplomatic agent

finds it convenient to absent himself from a function or meeting, he pleads sickness so as not to cause undue offence to any body. Such a feigned illness is known as "Diplomatic illness."

(i) **Territorial waters.** The seas adjacent to a country over which it has exclusive jurisdiction. The general convention is that territorial rights extend for three miles from the coast line measured from low water mark.

(j) **The Kremlin.** This term now refers generally to the great citadel in Moscow which was a public museum of Russian architecture. It is now the seat of Soviet government.

GENERAL KNOWLEDGE TESTS

PAPERS SET ON GENERAL SCIENCE IN RECENT COMPETITIVE EXAMINATIONS

Q. 1. (a) How does the pouring of kerosene oil on stagnant pools help to eradicate malaria ?.

(b) What is the scientific significance of the launching of the sputniks or Explorer ?

(Indian Administrative Services Exam. 1958)

Ans. (a) The anopheles mosquitos which are the cause of spreading malaria, breed in stagnant water. Kerosene oil is poured over stagnant pools of water in which the mosquitos hatch their grubs, so that this oil cuts off the supply of oxygen of the air to the grubs which therefore die by suffocation. Also, as they float on the surface of the water the oil gets stuck to them and kills them.

(b) The scientific significance of the launching of the Russian sputniks and the U. S. Explorer lies in the fact, that now there gets a possibility of man being able to travel in space and may be able one day to reach the moon and perhaps the planets circling round the sun, thus liberating man from gravitational forces that bind him to the earth.

Also, scientists can now extend research into cosmic space. The unexplored processes of natural phenomenon in the cosmos will now become more accessible to man, as such artificial earth satellites sent into space contain many types of instruments which send radio signals to instruments set up on earth and thus they get knowledge of many types of phenomenon about which they want to know.

Q. 2. There is one obvious error which is against scientific principle in each of the following five figures (see figures printed separately). Point out the error giving brief reasons. (Your answer should not exceed two lines in each case.)

(a) Fig. 1 is a U. tube containing water. The two limbs of the tube are wide but of unequal bore.

(b) Fig. 2 is the Hare's apparatus experiment to find the specific gravity of sugar solution. After the liquids have been sucked up, the pinch-cock C is closed.

(c) Fig. 3 shows two mercury barometers. The top space in the one contains a little air. In the other it is vacuum.

(d) Fig. 4 is an experiment on electrolysis of water with anode and cathode connected properly to a battery.

(e) Fig. 5 shows a dish with mercury and a steel ball in it.
(National Defence Academy Exam. June 1958)

Ans. (a) Water keeps its level whatever the shape or amount of the bores of two inter-connected tubes be. Therefore the error in this figure is that the level of water is shown differently. It should have been the same in both the tubes.

(b) The densities of two liquids are inversely proportional to their heights in an Hares' apparatus. If h_1 and h_2 are the heights of columns of water and sugar solutions and d_1 and d_2 respectively their densities then $h_1 d_1 = h_2 d_2$.

Now d_1 is $< d_2$ because sugar solution on account of sugar in the water is heavier than pure water, therefore h_1 is $> h_2$ to equalize the equation. The heights of the two liquids shown is, therefore the reverse of what it ought to be.

(c) The height of mercury column in B should be greater than in A, because in B, there is vacuum above the mercury, while in A, air is pressing the mercury column down.

(d) Hydrogen evolved is twice as great as oxygen, therefore the space in column B filled with hydrogen should be shown double of that in A.

(e) Steel is lesser in density than mercury; the steel ball should have been shown floating on mercury and not sunk at its bottom.

Q. 3 Answer the following. Your answer should not exceed the number of lines indicated at the end of each.

(a) The specific gravity of cork is 0.25. When a cork floats on water what fraction of its volume will be above water? (One line).

(b) How is the 'tonnage' of a ship related to the water displaced by it? (Three lines).

(c) How is expansion due to heat allowed for in railway lines? (One line).

(d) The colour of some cloth when seen in electric light appears different from the colour when seen in daylight. Why? (Two lines).

(e) How is soft iron different from steel as regards magnetic properties? (Three lines).

(National Defence Academy Exam. June 1958)

Ans. (a) $\frac{3}{4}$ th of its volume will be above water.

(b) The displacement tonnage of a ship (*i. e.* the "tonnage" of a ship related to the water displaced by it) is the vessels' actual weight in tons when laden and floating at the load draught.

To state in other words : The displacement of a ship in any given condition is the actual weight of that ship, including everything aboard her at that time. This weight or tonnage is equal to the weight of water displaced by the underwater volume of the hull, which volume can be readily calculated.

(c) Space is left between the rails where they meet on the fish plates. The screws are so fixed as to allow the rails to expand.

(d) This is due to the fact that the electric light has not many of the parts of the spectrum that the sun's light has.

(e) Soft-iron gets easily magnetised and loses its magnetism equally easily. Reverse is the case with steel which remains a permanent magnet, because its molecules arrange themselves permanently in one direction retaining their magnetic properties. Soft iron, as we have said, easily loses its magnetisms, because its molecules get easily deranged. hence it cannot be a permanent magnet.

Q. 4 (a) Name two processes of preparing oxygen on a commercial scale. (One line).

(b) By the interaction of what stable compounds is nitrogen chemically prepared in the laboratory? Write the equation. (Three lines).

(c) Name two commercial uses of hydrogen. (One line each)

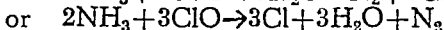
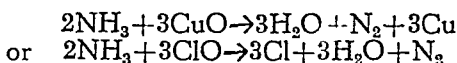
(d) Write against each of the following whether it is an element, a compound or a mixture :—

Air, Sugar, Gunpowder, Diamond, Ice, Silicon.

(National Defence Academy Exam. June 1958)

Ans. (a) By the electrolytic decomposition of water or by the liquefaction of air.

(b) (1) Nitrogen may be prepared by oxidation of ammonia. This oxidation may be brought about by hot copper oxide or by a hypochlorite in solution.



Nitrogen may be got by decomposition of Ammonium Nitrite $\text{NH}_4\text{NO}_2 \rightarrow \text{N}_2 + 2\text{H}_2\text{O}$

(c) Two important commercial uses of hydrogen are (1) In the synthesis of ammonia in the Haber and Claude processes (2) In the hardening of oils—*i. e.*, the conversion of liquid oils into solid fats.

(d) Air	mixture
Sugar	compound
Gunpowder	mixture
Diamond	element
Ice	compound
Silicon	element

Q. 5. (a) Choose the correct word or phrase from those given in brackets to complete the following.

- (i) A knot is a measure of———. (distance, speed, velocity.)
- (ii) The instrument used for measuring the humidity of air is called the——. (hydrometer, hygrometer, hypsometer.)
- (iii) In an ordinary looking glass the reflecting surface is the——. (back, front.)
- (iv) A voltameter is used to measure——(current, potential, resistance).
- (v) Caustic soda is ——-. (an acid, a base, a salt.)
- (vi) Carbon dioxide is———than air. (heavier, lighter.)
- (vii) Aluminium is extracted from——. (Bauxite gypsum, pyrites.)

(b) Give the chemical symbols for the following :—

Copper, gold, lead, mercury, potassium, silver.

(c) With what discoveries are the following names associated ?

Becquerel, Darwin, Edison, Faraday, Mendeleev, Roentgen.

(National Defence Academy Exam. June 1958)

Ans. (a) (i) A knot is a measure of speed.

(ii) The instrument used for measuring the humidity of air is called the **hygrometer**.

(iii) In an ordinary looking glass the reflecting surface is the **back**.

(iv) A voltameter is used to measure **potential difference**.

(v) Caustic soda is an **alkali** i. e. base.

(vi) Carbon dioxide is **heavier** than air.

(vii) Aluminium is extracted from **bauxite**.

(b)	Copper	Cu
	Gold	Au
	Lead	Pb
	Mercury	Hg
	Potassuim	Pt
	Silver	Ag

(c) **Becqueral** : Radio-activity.

Darwin : Evolution of the species theory.

Edison : Incandescent lamp, phonograph, motion picture projector and camera, carbon telephone transmitter.

Faraday : The dynamo.

Mendeleev : The Periodic law of the atomic weights.

Roentgen : X-rays.

Q. 6. (a) What is pasteurized milk ? (Three lines)

(b) The following list contains organs of the body and their secretions in the digestion of food. Pair them off correctly by writing the name of the organs first and then the name of its secretion :—

Bile ; gastric juice ; insulin ; liver ; pancreas ; stomach.

(c) The following list contains the names of the important bones in the arm and leg. Pair off the corresponding bones from each limb.

Carpal, femur, humerus, radius, tarsal, tibia.

(d) The following list contains the names of the diseases and antibiotic drugs used in their cure. Pair them off correctly.

Chloromycetin ; penicillin ; streptomycin ; tonsillitis, tuberculosis ; typhoid.

(e) Fill the blank, choosing the correct word from the pair given :—

- The blood in the artery flows——the heart. (away from, towards.)
- The body is defended against harmful germs by the——
——corpuscles (red, white.)
- Rickets are caused by deficiency in——(Vitamin D, Vitamin C.)
- The first teeth to come out in a child are the——.

(National Defence Academy Exam. June 1958)

Ans. (a) Pasteurization of milk is the treatment of milk to make it free from disease causing bacteria. Milk is heated to 145° F

for 30 minutes and is then cooled rapidly before being sealed in a vessel.

- | | |
|--------------------------|---------------|
| (b) <i>Liver</i> : | Bile |
| <i>Pancreas</i> : | Insulin |
| <i>Stomach</i> : | Gastric juice |
| (c) <i>Arm</i> : | Leg |
| <i>Humerus</i> : | Femur |
| <i>Radius</i> : | Tarsal |
| <i>Carpal</i> : | Tibia |
| (d) <i>Tonsillitis</i> : | Penicillin |
| <i>Tuberculosis</i> : | Streptomycin |
| <i>Typhoid</i> : | Chloromycetin |
- (e) (i) The blood in the artery flows **away from** the heart.
 (ii) The blood is defended against harmful germs by the **white corpuscles**.
 (iii) Rickets are caused by deficiency in **vitamin D**.
 (iv) The first teeth to come out in a child are the milk teeth.

Q. 7. Who or what are the following ? (One or two lines each.)

Beam system, Explorer (or 1958-Alpha) IRBM, Laika, Monazite, Pitchblende, Sputnik II, Zeta.

(National Defence Academy Exam. 1958).

Ans. Beam system is the system of highly directional, narrow radio transmission, using very short (high frequency) waves and specially designed antennas.

Explorer : It was the earth satellite sent into space by the Americans).

I. R. B. M. : Inter Continental Ballistic missiles (of the Russians,

Laika : The dog enclosed in the Sputnik II by the Russians.

Monazite : One of the rare earths and the chief source of thorium and cerium ; occurs in the sea beach sands of the Kerala state.

Pitchblende : It is a dark, lustrous amorphous mineral, source of radium, uranium, polonium and plutonium. Occurs in small quantities throughout the world. Canadian Great Lakes, Belgian Congo and Czechoslovakia are major sources.

Sputnik II : This was the second earth satellite sent into space by the Russians. It was far bigger than Sputnik first.

Zeta : The last word of the Greek alphabet which begins with Alpha. It corresponds to Z of the English.

Q. 8. Describe how you determine the following experimentally :—(15 lines each).

(a) The coefficient of apparent expansion of coconut oil with a specific gravity bottle.

(b) The resistance of a coil with a metre bridge.

(Military College Exam. June 1958)

Ans In order to find out the coefficient of apparent expansion of coconut oil with a specific gravity bottle we perform the following experiment :—

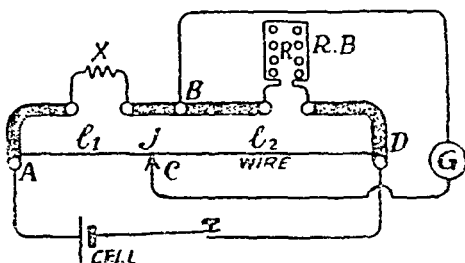
The empty bottle is cleaned and dried and then weighed. It is then filled with the coconut oil at room temperature (we call this temperature t_1) and weighed again. This gives us the weight of the coconut oil put in the specific gravity bottle. The bottle is next heated to a constant higher temperature (call it t_2) in a thermostat. It is to be noted that the neck and mouth of the bottle must be outside the liquid of the thermostat. During the time the bottle has been in the thermostat, say for fifteen or twenty minutes, the coconut oil, due to expansion of the bottle and itself, must have overflowed through the hole in the stopper of the specific gravity bottle. The bottle is now cooled and weighed.

By subtracting the weight of the empty bottle from this weighing we get the weight of the coconut oil as it filled the bottle at the higher temperature of t_2 (say it is w_2). But we already know the weight of the coconut oil filling the bottle at the lower temperature.

$$= \frac{\text{Co-efficient of apparent expansion of the coconut oil} \times \text{weight of the coconut oil expelled}}{\text{weight of the coconut oil filling the bottle at higher temperature.}}$$

(b) "The Meter Bridge is a special form of the Wheatstone's bridge for measuring resistance. The meter bridge consists of a uniform metal wire stretched upon a wooden base. There are thick strips of copper mounted in the same board as shown in the figure drawn here. There are two gaps between the copper strips, in one of which, the coil, shown as X in the figure whose resistance is to be measured, is connected, while in the other a resistance box (shown as R.B. is joined). To a number of terminals also provided the electrical cell and the galvanometer are connected as shown in the figure.

Now ABC as shown in this figure, are the points where any two of the four conductors are connected forming the corners of



the bridge. A cell and a tap key are connected between the corners A and D and the galvanometer with one end connected to B and the other end to the movable contact C. The friction at C can be moved over the length of the wire to such a position that the bridge becomes balanced or no current passes in the galvanometer when the contact at C is made.

X, the coil, is the unknown resistance to be measured, a resistance R taken out of the resistance box (RB) forms a second arm of the bridge, while the resistances of the lengths l_1 and l_2 of the wire are the third and the fourth arms respectively. Suppose K ohm. is the resistance per centimeter of the bridge wire, then the bridge is balanced when

$\frac{X}{R} = \frac{Kl_1}{Kl_2} = \frac{l_1}{l_2}$ or $X = R \cdot \frac{l_1}{l_2}$. Now R, l_1 and l_2 are known quantities, hence X can be easily calculated.

Q. 9. (a) Account for the following :—

- (i) A ship rises as it enters the sea from a river.
- (ii) Water pipes often burst in cold countries during winter.
- (iii) A convex mirror is used by the motorist to see the road behind him.
- (iv) The flash of lightning is seen before the sound of thunder is heard.
- (v) Fuse wires are always provided in electrical installations.

(b) Distinguish between the following :— (4 lines each).

- (i) Density and relative density.
- (ii) A vapour and a gas.
- (iii) Short sight and long sight.
- (iv) Conduction and convection of heat.
- (v) Voltmeter and ammeter.

(Military College Exam. June 1958)

Ans. (a) (i) This is due to the fact that the sea water is much more saltish than river water. and its density is therefore much higher than that of river water.

Now the denser the medium in which a thing floats, the lesser will it sink in it. Hence a ship rises as it enters the sea from a river.

(ii) This is due to the fact that water as it solidifies into ice in water expands and in this expansion process it exerts considerable pressure on the sides of the pipe, which get burst.

(iii) The convex mirror of the car gives an enlarged image of the objects behind the driver, hence it is kept before him to make him aware of objects moving behind him. This enables him to avoid accidents, specially at turning points.

(iv) This is because the speed of light is far greater than that of sound. Hence the flash of lightning is seen before the sound of thunder is heard.

(v) The fuse wire melts when the current flowing through wires is of an unusually high voltage. The melted fuse thus disconnects the electrical installation through which the current is flowing and thus saves accidents.

(b) (i) By the density of a substance is meant the mass or weight of the substance per unit of volume. It is usually expressed in lbs. per cubic ft. or grams per cubic centimeter. Thus if m is the mass of a body and v its volume, then its density d is given by the formula $d = \frac{m}{v}$.

Relative density (also called specific gravity) is defined as the ratio of the mass of a certain volume of a material to the mass of an equal volume of a standard substance. This standard substance in the case of liquids is water.

Thus the density of alcohol is 50.4 lbs. per cubic feet and of water 62.43 lbs. per cubic ft. Therefore, the relative density of equal volumes of alcohol and water is $\frac{50.4}{62.43}$ or $= 0.808$

(ii) A gas may be defined as a form of matter that has neither volume, nor shape, and is such that when a given quantity of it is introduced into a vessel, it will fill the vessel completely. Gases are elastic, expanding and contracting uniformly and obeying Boyle's and Charles' Laws.

"Vapour is the term applied to a gas only slightly above the temperature at which it condenses into a liquid. Though there is no definite line of distinction between a vapour and a gas but it is generally understood that a vapour is in such a condition that it does not obey the Boyle's and Charles' laws which describe the behaviour of true gases under change of temperature and pressure."

(iii) In conduction heat is carried from particle to particle in solids, without the particles actually moving away from their original position in the solid.

In convection, the particles actually move about conveying heat from themselves to those at lesser temperature.

(iv) **Short-sightedness**; also called Myopia is the inability to see distant objects distinctly owing to the eye, or surface of the cornea, being too long, so that parallel rays of light are brought to a focus in front of the retina. This structural defect of the eye is rectified by the use of concave lenses.

Long-sightedness also called hypermetropia is a defect of the eye in which the eye is unable to see near objects, while the objects situated beyond a certain distance can be seen very clearly. Opposite to the case of short-sightedness, the image of an object is formed behind the retina. The lens of the eye cannot make itself sufficiently convergent to bring the image of the object on the retina.

This defect is corrected by a convex lens in the spectacle a man should use.

(v) Both the ammeter and the voltmeter are portable moving coil galvanometers.

In the case of the ammeter the strength of an electric current is measured in amperes or milliamperes which is read directly on the scale. In the case of the voltmeter, the difference of potential is measured in volts or millivolts marked on the scale.

An ammeter has a low resistance and is connected in series in the circuit in which the current is to be measured, but the voltmeter on the contrary has high resistance and is connected in parallel across the circuit, at the ends of which the difference of potential is to be measured.

Q. 10 (a) Describe, with the aid of a diagram, an experiment to show that air contains one-fifth of its volume of oxygen.

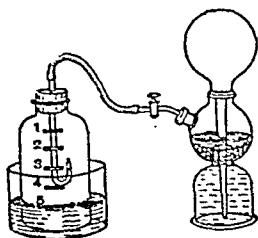
(b) Explain what happens in the following cases when :—

- (i) Potassium nitrate is strongly heated.
- (ii) Manganese dioxide is strongly heated with concentrated hydrochloric acid.
- (iii) Hydrogen sulphide is passed through a solution of lead nitrate.
- (iv) Zinc dust is added to a solution of copper sulphate.

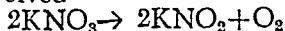
(Military College Exam. 1958)

Ans. (a) Burn a jet of hydrogen from a Kipps' apparatus inside a graduated bell-jar over water. The gas is turned off as soon as the flame goes out. After cooling, one fifth of the air will

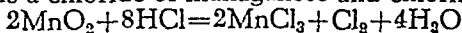
be found to have disappeared, for water in the jar has risen to $\frac{1}{8}$ th of the inside volume of the jar, filling that portion—of the oxygen of the air—which has combined with hydrogen to form water.



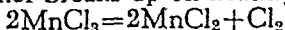
(b) (i) Potassium nitrate gets converted into potassium nitrate and oxygen is evolved



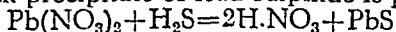
(ii) It forms a chloride of manganese and chlorine is evolved



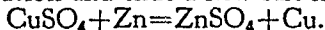
The MnCl_2 further breaks up on heating



(iii) A black precipitate of lead sulphide is produced



(iv) Copper of the copper sulphate is displaced by the zinc placed in the solution and thus a new salt is formed.

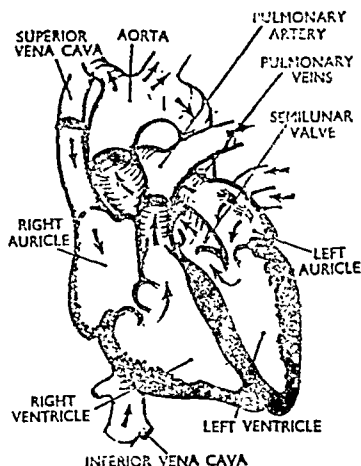


Q. 11. (a) Draw a diagram of the human heart, showing its important parts and the connected blood vessels.

(b) What are the symptoms of cholera? Explain how it is caused and how it may be prevented. (15 lines)

(Military College Exam. June 1958)

Ans (a)



(b) **Symptoms.** The onset of symptoms of cholera are violent diarrhoea soon followed by vomiting. After a first few evacuations the motions assume the typical rice-water character. They are watery, almost colourless, with a few white shreds of mucous membrane floating in them and they have an albuminous smell. The motions are almost continuous and are passed without feeling of pain. The vomiting is precipitate, profuse and watery. The eyes of the patient get sunken, and the cheeks hollow, the skin is clammy and slightly bluish, the fingers get shrivelled, the throat is dry and the voice becomes a husky whisper.

Causes. It is due to microbic infection, the microbe being the *cholera spirillum* or Koch bacillus, which is transmitted by means of infected water, flies, food, etc., taken unknowingly by the patient.

Prevention. When cholera has broken out, one must drink only covered water which has been cooled after boiling, and refrain from eating any uncooked food, specially salads and food that has been left uncovered and exposed to flies. The excreta of the sick must be mixed with an antiseptic before being poured down a gutter as a preventive.

Q. 12. (a) Write short notes on the following :—(3 lines each)
Mulberry, Cod, Emerald, Sesame, Reindeer

(b) State the achievements of the following :—(3 lines Each)
Volta, Fraunhofer, Priestly, Mendal, Sir Fredrick Gowland Hopkins.

(Military College Exam. June 1958)

Ans. (a) Mulberry. It is a deciduous tree with black (sometimes white) berry like fruit. It is used to feed silkworm.

Cod. It is a food fish found mostly in N. Pacific and N. Atlantic. Its flesh is processed in cans and it produces the famous Cod liver oil, which is taken for its richness in Vitamin A.

Emerald is a precious stone. It is a green variety of beryl. It is a silicate of beryllium and aluminium. Best emeralds come from Colombia.

Sesame. It is a plant grown mostly in India from which oil is pressed. This oil is used in making soap, in cookery and as a lubricant.

Reindeer. It is a deer with long horns, with branches sometimes as many as twelve found throughout the northern parts of the New and the Old World. Taken into service by Eskimos as a beast of burden.

(b) Volta is one of the inventor of the first electric batteries, the voltaic pile, and of the electric condenser.

Fraunhofer. He was the first to plot carefully dark lines in the solar spectrum.

Priestly made numerous important discoveries *e. g.*, oxygen, ammonia, nitrogen and its oxides, carbon monoxide and many others.

Mendel. He announced the Mendelian laws of heredity.

Sir Frederick Gowland Hopkins is famous for doing pioneer research work on vitamins.

Q. 13. Describe how rivers act as agents of denudation, transport and deposition of earth. Illustrate your answer by reference to an Indian river. (30 lines)

(Military College Exam. June 1958)

Ans. (a) Rivers play a great part in the denudation, transport and deposition of earth at great distances from their mouths. When there is a heavy downpour, as for example during the monsoon months when there is a great downpour on the slopes of the Himalayan hills and valleys, huge quantities of soil, dissolved in the running water are carried down to the plains below. When the rivers are in spate this dissolved soil material does not get deposited on the river bed, but is carried far into the sea, where it gets deposited. The huge delta basins of the Ganga and the Nile rivers have formed in this manner.

When after the rains are over, the rivers get slow, they cannot carry the heavy load of the silt they bring with them and these they deposit at many places during their course. The land receiving fresh layers of soil gets dried up and the river thus changes its course leaving its old bed covered with soil and sand.

As a writer puts it, the average soil load for the Mississippi river of the U.S.A. is only 0.07% and the maximum is 0.8%. Nevertheless this represents an average of 340 million tons in suspension and 40 million tons dragged along the river's bottom, to which must be added 136 million tons of dissolved matter. The total of 516 million tons a year is equivalent to the removal of a layer a foot thick from the whole 12,500,000 sq. miles basin every 6000 years. These figures thus bear eloquent testimony to the fact that rivers are active agents in the denudation of the land. Our whole Gangetic plain has thus been formed with thick soil going several thousand feet deep by the soil the Ganga and its tributaries have brought down from the high slopes of the hills many of which you find now quite bare of soil.

Q. 14. (a) Explain, why daytime in India is longer in June than in December. (15 lines)

(b) Examine the essential conditions for rainfall in a region.
(Military College Exam. June 1958)

Ans. (a) If the axis of the earth was perpendicular to the plane of the earth's orbit, days and nights in all parts of the earth would be twelve hours in length all the year round. but since the axis has been calculated to be inclined $23\frac{1}{2}^{\circ}$ from the vertical and always points towards the North Star, this inclination is the cause of change of length of day and night during summer and winter. Now on March 21st of every year the tilt of the earth's axis is across the rays of the sun i. e. the sun is exactly opposite the earth's equator, days and nights are equal throughout the world. From that day the tilted axis of the earth goes on pointing towards the sun in the northern half, while that of the southern half gets reversed. This means that after March 21, days in the northern hemisphere, in which our India lies, begin to get larger and nights shorter, This tilt gets completed by June 21st, so that in mid June the day is the longest and night the shortest. By Sep. 22, the days get of equal length again and now by December 22, the above conditions get reversed so that by December 22, the days are the shortest in India.

(b) The distribution of rainfall over the surface of the globe shows a marked relationship to the mean distribution of barometric pressure and the general flow of air. Thus high pressure areas over sub-tropical belts and polar regions correspond to dry masses. All the great deserts of the world, where precipitation is below 10 inches per annum lie in these regions e.g., the Sahara desert, the dry regions of Arabia, the Thar desert, the Nubian desert in the northern hemisphere, the Kalahari desert in South Africa and Australian desert lie in this region; so are the polar regions quite dry. The well marked equatorial, and north and south temperate belts of low pressure correspond to relatively wet area. As the amount of water a given volume of air can hold nearly doubles for each rise of temperature of 18°F , so the rainfall is usually the greatest in the warmest regions. In order to become saturated with water vapour to a considerable depth, air must travel over a long stretch of ocean and therefore such air masses give a greater rainfall than those which have passed over land surfaces. Thus the monsoon winds after flowing over the Indian ocean bring heavy rains to the Indian sub-continent, Burma, China and Japan.

It should also be noted that generally all those lands which are in the proximity of great ocean masses have more rainfall than lands far inland inside the continents in the same latitude. Thus the west regions with an average rainfall of 60 inches or more include the high lands in the west of Ireland, Great Britain, Norway, the north-west of Spain etc. where the rain-laden westerly winds blow directly against high lands which are more or less in proximity of the great Atlantic ocean. On the other hand there is less than 20 inches rain over much of the north and east as well as in the east of Spain, in continental Russia and around the

Caspian sea which are far removed from the Atlantic Ocean or where winds of the Atlantic Ocean do not prevail as in the east of Spain.

Similarly the Gobi in N. W. China is a rainless desert as the rain-laden winds do not reach here, while the east coasts of China and Japan in proximity to the Pacific Ocean receive heavy rainfall though they are in the same latitude as the Gobi desert.

Q. 15. What are the following ?—(3 lines)

The Great Bear, Rain Gauge, Lake, Savanna, Barometer, Estuary, Cape, Isotherm, Gulf Stream, Tributary.

(Military College Exam. June 1958)

Ans. The Great Bear, also called the Ursa Major, is a constellation of the Northern hemisphere. It consists of seven bright stars, two of which are known as "the pointers", since a line joining them will, if produced, pass close to the celestial pole and the Star Polaris.

Rain Gauge. This is an instrument for measuring rainfall. It consists of a copper funnel, whose top has a fixed area, and whose neck fits into a bottle or cylindrical can. The funnel and can are then enclosed in a metal cylinder considerably taller than the funnel so as to retain therein water as received. The measurement is made by pouring the collected rain water into a glass measure marked to represent hundredth of an inch.

Lake. A lake is a sheet of water formed in a depression of earth's surface. Examples : Great Lakes of North America.

Savanna is a wide grassy treeless plain equivalent to a pampas or a prairie or a steppe. It is lushy green in the rainy season, but otherwise it is devoid of much vegetation in the rest of the year.

Barometer. This is an instrument for measuring atmospheric pressure. The tube is graduated in inches and fractions ; 30 inches being regarded as normal pressure at sea level.

Estuary. An estuary is the outlet of a river where it meets the sea.

Cape. A cape is a head or point of land running into the sea. Example : Cape of Good Hope.

Isotherms are lines drawn on a map joining up all those places where the temperature is the same.

Gulf stream. This is the great ocean current, about 50 miles broad, that issues from the Gulf of Mexico and flows along the coast of North America as far as New Foundland, and from there it turns in N. E. direction across the Atlantic. throwing out a branch which skirts Spain and Africa, while the main branch visits the shores of Britain and Europe right upto Iceland. It is the genial

influence of this current that gives to Britain its warm and humid atmosphere.

Tributary is a stream that joins a big river of a country. Thus the Jamuna, Sone, Gandak, etc are tributaries of the Ganga.

Q. 16. Write notes of about five lines each on any five of the following :

- (a) Protective foods
- (b) Sulpha drugs.
- (c) Cigarette smoking and lung cancer.
- (d) Nature cure.
- (e) Lignite and its importance to industrial development of Southern India.
- (f) Effect of radio-activity on unborn generations.
- (g) Jet-propulsion.
- (h) Atomic reactor.
- (i) Geophysical year.

(Indian Administrative Services Exam. 1957)

Ans. (a) **Protective foods** are those foods which are rich in vitamins, e.g., butter, etc., green vegetables, fruit and fish, especially herrings.

(b) **Sulpha drugs.** These are synthetic chemicals containing the sulphur radical (SO_2NH_2) used in the treatment of bacterical diseases, e. g., pneumonia, gonorrhea, crsipelas, meningites, blood poisoning, kidney infection, septic soar throat etc. Most important are sulphonamide, sulphadiazole, sulphadiazine, sulphapyridine etc.

(c) Scientists who have tried to observe the habits of cancer patients and their past habits have declared that majority of the patients were either chain smokers or chewed tobacco, while non-smokers among the lung cancer patients were invariably fewer. This is perhaps due to constant irritation of the throat, the bronchial tubes and the lungs, which produce the well known smokers' cough and much expectoration.

(d) **Nature cure.** This is the system of cure in which the taking of medicine or medical herbs is dispensed with for the cure of certain ailments. Instead, the patient is treated with hot or cold water, steam, electricity, or is prescribed sun bathing or other methods in which nature is allowed to work.

(e) **Lignite** is sub-bituminous coal, intermediate between peat and coal produced in the Arcot district of the Madras state. It is of little value as fuel owing to its crumbling nature and the large amount of smoke it produces. It may be used for producing

briquettes and the destructive distillation process for extracting hydrocarbons which may be put to industrial uses or may be mixed with high grade coal for industrial uses.

(f) Many scientists are of the opinion that every atomic test the great powers are carrying adds to the absorption of radioactive particles in the air, the ionosphere in particular, which goes on being charged radio-actively. The atmosphere is thus being increasingly radio-actively charged. Radio-activity will in the future be responsible for leukemia, the fatal disease of white blood cells, which U. S. scientists have said would be responsible for 10,000 more deaths per year in the U.S.A. alone. Radio-activity will also be responsible for increase in bone cancer, less fertility, increase in the mortality and morbidity of the future species on earth.

(g) **Jet Propulsion.** As generally applied in the propulsion of aircraft, this consists in the burning of fuel with previously compressed air in a combustion chamber or chambers, from which the hot gases pass into a circular chamber open to the atmosphere and facing rearward in the aircraft. The escaping gases at high velocity, provide a reaction which gives the aircraft a forward thrust which is directly proportional to the amount of air gas acceleration.

(h) The **Atomic Reactor** is an apparatus of great size having thick protective walls that are necessarily made for the purpose of starting and maintaining under control, the process of nuclear fission in a continuous or "chain" reaction. It is used for the production of plutonium from uranium, for the generation of usable heat and for the production of radio-active isotopes or as a source of neutrons and gamma rays.

(i) The International Geophysical year began in July 1957 and lasted until December, 1958. Its investigations fell into three groups of simultaneous world wide observations in which fifty nations of the world participated involving an expenditure of £100 million. First, those concerned with the surface or interior of the earth : glaciology, oceanography, seismology, latitude and longitude ; second : those concerned primarily with the lower atmosphere, that is, meteorology ; and lastly, those concerned with the upper atmosphere and with the electro-magnetic and external forces affecting the earth : geomagnetism, aurora and air-glow, the ionosphere, solar activity and cosmic rays.

Q. 17. Attempt any two of the following :—

(Your answer should not exceed 10 lines for each part.)

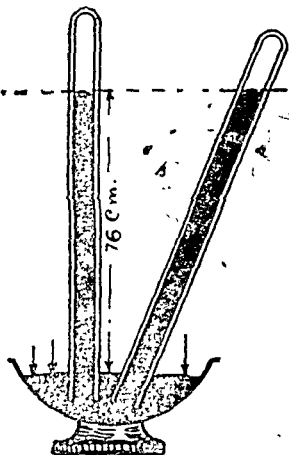
- (a) Describe how you would use mercury to show that the atmosphere has weight and how you would measure the weight ?
- (b) Explain why and how the pitch of a train's whistle varies as the train approaches and goes away.

- (c) Explain briefly why a lake freezes from the top instead of from the bottom.
- (d) Explain how a lens or reading glass is used to correct short-sightedness. Illustrate your answer with a diagram.

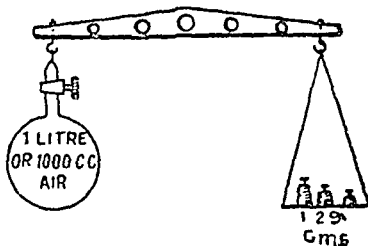
(National Defence Academy Exams. 1957)

Ans. (a) Fill a glass tube, which has one side closed, with mercury and placing your thumb on the other end invert the tube on a trough filled with mercury, taking care that in the process air does not escape into the mercury column in the tube.

It will be seen that as the mercury filled tube stands on the mercury in the trough, the mercury stands upto a height of 76 cms. above the level of the mercury in the trough. Now what is it that makes the mercury stand in the tube and not fall down into the mercury in the trough? This is the pressure of the atmosphere on the free surface of the mercury in the trough, as shown by arrows in the figure that makes the mercury in the tube to stand to a height of 76 cm. This pressure is due to the weight of the atmosphere. A weightless thing cannot exert any pressure on anything.



The weight of air can be measured if we take a one litre flask, which is provided with a leak tight stop cock. The flask is thoroughly evacuated with the help of a vacuum pump, so that the air contained in it is emptied. The stop cock is closed, and the flask suspended from one arm of a balance, and weights placed in the other arm, to counterpoise. If now the stop cock is opened so that air fills the bottle, the weight in the other pan has to be increased by nearly 1.29 grams for one litre of air.



(b) When a source of sound which is producing a note of constant pitch is moving at a considerable speed, a listener towards whom the sounding body is coming hears a note, the pitch of which is higher than the pitch heard if the source were stationary

with respect to the listener. Similarly to another person from whom the sounding body is going away at high speed, the same pitch of the sound appears to be lower.

This apparent change of pitch of the sounding body in motion (and for that matter, a whistling engine coming to a station and going away from it, may be taken as an example) is due to the fact that while the sounding body is approaching a person standing at a place, more waves fall on his ears per second than if he was at rest with respect to the sounding body. Similarly, when the sounding body is moving away from a person, fewer waves fall on his ears per second and the pitch thus appears to be less.

(c) The surface of the lake is in contact with cold air whose temperature in winter in cold countries falls below the zero point. The water in the lake is surrounded by earth, which does not get so cold on account of its internal heat and therefore does not freeze it. Hence when winter comes the cold atmosphere over the lake freezes the water at the surface. As it assumes the shape of ice, it becomes a big slab of ice, floating on the surface of the lake, because volume for volume ice is lighter than water and hence floats on the latter. This ice slab covering the whole surface of the water of the lake, serves as a covering to the water of the lake so that cold air is unable to penetrate to the lower levels of the water in the lake to further freeze it, near the bottom, hence the water in the lake does not freeze from the bottom upward. The ice slab being lighter than water also does not fall at the bottom; therefore freezing does not begin from below.

(d)

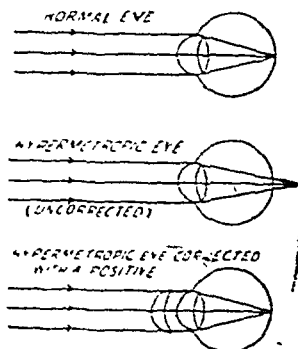


Fig 76

In short-sightedness the image of a far off object instead of being formed on the retina of the eye is formed at some points in front of it. In this case either the eye lens is too converging, i. e., of too short a focal length so that it brings the parallel rays coming from distant objects to a focus in front of the retina instead of

upon the retina or it may be due to the fact that the eyeball is too elongated so that the distance from the eye lens to the retina is greater than the focal length of the lens and therefore the image is formed in front of the retina as shown in this figure. To remedy this defect we have to make the action of the lens less convergent or in other words, to increase its focal length. This is done by using a concave lens (called negative lenses) for the spectacles.

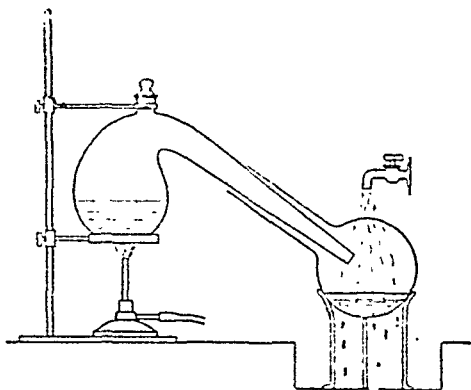
Q. 18. Attempt any two of the following :—

(Your answer should not exceed 10 lines for each part).

- If you were given a solution of common salt in water, describe how you would find the percentage of salt in the solution.
- Describe the usual laboratory method of preparing oxygen.
- Name the three main gases in the air and explain the chief use made of each by animals or plants.
- Explain the difference between veins and arteries.
- Describe shortly five methods of avoiding malaria.

(National Defence Academy Exams. 1957)

Ans. (a) One of the methods employed for this purpose among others is to heat the solution in a closed retort, so that the volatile water is condensed again in a weighed flask. The non-volatile salt remains in the residual solution and forms a solid residue. The condensed water and the solid residual salt are both weighed. It is then easy to find by simple arithmetic the percentage of salt in the solution.



(b) The usual laboratory method employed to obtain oxygen is to heat potassium chlorate mixed with manganese dioxide. The latter serves as a good catalyst. Thus a mixture of 10 gm. of manganese dioxide with about 60 grammes of potassium chlorate

(called oxygen mixture) evolves oxygen freely when heated in a large glass tube at a temperature below the melting point of the chlorate.

(c) The three main gases in the air are : oxygen, nitrogen and argon.

Oxygen

Oxygen forms an essential part of the blood and tissues of animals. The haemoglobin of the blood takes in oxygen as the animal inhales air during the process of breathing and this oxygen helps in the building of animal tissue.

Also every living creature whether it is an animal or a plant *respires*, that is to say it takes oxygen from the air and makes it combine with glucose contained in its food, and gives out water and carbon dioxide. By this process it produces heat and the energy it requires for motion, growth, etc.

Nitrogen

Nitrogen of the air is utilized by plants through a process called the "fixation of nitrogen" by bacteria in the soil round the roots of plants. The plants use the nitrogen compounds so produced by sucking their solution through their roots and thereby building up their bodies. Nitrogen compounds are essential for the life of plants and therefore ammonium salts and nitrogen are valuable and necessary fertilizers.

It should also be noted that in the track of a lightning flash, a little of the nitrogen and oxygen of the air combine to form the gas nitric oxide (NO).

This combines with air and water to form nitric acid and nitrogen acid. These acids descend in the rain and in the soil to form nitrates and nitrites which plants utilize as food.

The gas argon is not directly used by man or plant for building its body. It is used as an inert gas in electric lamps to save the electric wire inside a bulb from rusting.

(d) A vein brings impure blood from the body to the heart. An artery carries pure blood from the heart to the rest of the body.

(e) To avoid malaria :—

1. Take quinine or any such newly invented anti-malarial drugs.
2. Use a net when going to bed so that anapholes mosquito carrying parasites in its saliva does not bite you.
3. Destroy the anapholes mosquito as much as possible.
4. Fill up stagnant pools of water around your house so that the mosquito does not breed there. Similarly fill up all swampy lands around your dwelling.

Spread kerosine oil over water if filling up of pools is not possible.

5. Another preventive measure is to include the installation of tanks with fish to devour the larva of the mosquito.

Q. 19. Attempt the following :—

- (a) Write down briefly in not more than 8 lines three reasons for supposing that the earth is not flat.
- (b) Name the states 1 to 4 in the Deccan.
- (c) Mention in their correct order the three main processes through which cotton goes between plucking and sale as cloth.
- (d) Mention in their correct order three processes through which tea goes between plucking and packing.

(National Defence Academy Exams. 1957)

- Ans. (a)**
- (i) The shadow of the earth on the moon, which makes the different phases of the moon is always round and not flat.
 - (ii) The topmost of a ship coming into view from a distance is seen first, then as it approaches us we see its middle and last of all the hull. This observation is reversed when the ship is leaving port. If the earth were flat, all the parts of the ship would be observed all at once. The observations recorded above are possible only if the earth is a round globe.
 - (iii) If we sail round the earth, say exactly to the west on the same latitude from Colombo and following the same latitude on land masses by horse, train or foot, we would reach back at Colombo on circumnavigating our earth. That would be possible only if the earth is round. This experiment can be performed with an aeroplane closely following the earth on the same latitude. The aeroplane will come back exactly to the same spot, showing that it has circled round a globe.
- (b)**
1. Mysore.
 2. Andhra Pradesh.
 3. Kerala.
 4. Madras State.
- (c)** 1. Cotton, after plucking is normally ginned at or near the cotton growing area. Ginning separates the fibre from the seed. After ginning, the cotton is compressed into hard pressed bales, sent to market, graded and either shipped or sent to a cotton factory.

2. **The spinning process.** First the hard pressed bales, after removing their steel bands and jute baggings are fed into opening machinery which loosens the cotton and removes the dirt. It is finally delivered in the form of a thick even layer rolled to a bar from which it can be fed into the card. The function of the card is to open the cotton completely, remove foreign matter and tangled hairs by passing the material between moving surfaces covered with steel wire points and delivering a soft, untwisted strand of loosely assembled fibres called a silver. This silver looking like a white rope is coiled round a tall can and is next transferred to a draw frame.

Six or eight silvers are next combined and drawn through successive rollers till fine strands are obtained. The next process is to spin the strands and lastly to weave them to form cloth.

(d) After the tea leaf has been plucked it is taken and transferred to baskets in which the leaf is picked over for removal of stalks and all extraneous matter and transferred to the factory for manufacture.

Next, the green leaf is subjected to sifting on large sieves and to mechanical action. The next process is of *fermentation* or oxidation by the spreading of the leaf in a cool humid atmosphere and then drying or firing in a machine where hot air is forced into a chamber through which the leaf passes. Last of all sorting is done, whereby the tea is sifted and if necessary cut into various grades.

Q. 20. Answer any ten of the following :—

- (a) How many miles does sound travel in a minute ?
- (b) Which travels fastest : a high note, a low note, a soft note or a loud note ?
- (c) Name the safety loading mark on a ship.
- (d) What is a hydrometer used for ?
- (e) What is an ammeter used for ?
- (f) What is the use of prisms in binoculars ?
- (g) What causes an object to look black ?
- (h) Under what condition do a feather and a lump of lead fall at the same time ?
- (i) Which is better—to transport electricity at a high current or a high voltage ?
- (j) What is used to change the voltage of an alternating current ?
- (k) How do you convert Centigrade readings to Fahrenheit.
(National Defence Academy Exams. 19th).

Ans. (a) $12\frac{1}{2}$ miles per minute (1100 ft. per second).

(b) Same in all types of notes.

(c) Plimsol line.

ad
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- (d) An ammeter is used in electricity to measure the strength of an electric current in amperes.
- (e) The prisms in binoculars reflect the light up and down the short tube. This has the same effect as a longer tube. This has the effect of taking in a larger field of vision than could be got in the small tubes without prisms.
- (f) An hydrometer is used to determine the density of a liquid.
- (g) All the rays of the spectrum are absorbed and none is reflected back.
- (h) In a vacuum.
- (i) At high voltage.
- (j) A transformer.
- (k) To turn Centigrade temperatures into Fahrenheit temperatures the rule is that the Centigrade reading should be multiplied by 9, then divided by 5 and 32 be added to this sum. Thus to convert 103°C to the Fahrenheit scale the following process is gone through

$$103^{\circ}\text{C} = \frac{103 \times 9}{5} + 32^{\circ}\text{F}$$

$$= 217.4^{\circ}\text{F}.$$

Q. 21. Answer any ten of the following :—

- (a) What was the earliest method of converting iron ore to iron ?
- (b) What is the difference in the composition of iron and steel ?
- (c) How does the sap rise in a tree ?
- (d) What is the biggest mammal in the world today ?
- (e) Why is man's elementary canal so long ?
- (f) What other organ in the body is also constructed on a similar principle ?
- (g) Give another name for rusting.
- (h) What do you call a substance which promotes a chemical reaction without entering into it ?
- (i) What metal is most important in the production of atomic energy ?
- (j) How is crude oil turned into petrol ?
- (k) What is the alloy of tin and lead used for ?
- (l) What is the most common chemical method of purifying water ?

(m) Name three rare gases.

(n) What chemical function does saliva perform ?

(o) Why is air removed from an electric light bulb ?

(National Defence Academy Exams. 1957)

Ans. (a) The earliest method of converting iron ore to iron was that iron ore was reduced by successive processes of heating and hammering. The ore was broken into small lumps, mixed with marl and lime which bound it together and this thus acted as a flux. It was then heated in a charcoal fire blown by bellows. After repeated heating and hammering the iron was obtained.

(b) Steel differs from iron in this that it usually contains 2% carbon, and under 1% of manganese with traces of silicon, phosphorus, sulphur etc. Unless iron is very pure it may contain many types of impurities, which need not be mentioned here.

(c) The sap enters the roots by Osmosis and runs up the stem of a plant by some such power as capillary attraction or the cohesive force of water in the sap, assisted by the osmotic pull exerted by higher sap concentrations in leaves due to loss of water by evaporation in the leaves.

(d) Elephant.

(e) Unlike carnivorous animals, man uses much vegetable matter for his food. Vegetable matter is not so quickly digestible as pure animal food, hence he requires a much bigger and larger number of juice glands to digest the food he takes. Also he must hold the food much longer for the digestion to take place. The quantity of food a man takes is also comparatively larger in proportion to his body than that of a carnivorous animal. All this requires a very long alimentary canal for the thorough digestion of the food, hence man has such a long alimentary canal in which the digestive process must be completed in different parts and at different stages of the food.

(f) The circulatory system.

(g) Oxidation.

(h) A catalyst.

(i) Uranium.

(j) By successive fractional distillation of the crude oil and by a process known as the "cracking process".

(k) The alloy of tin and lead is called pewter. It is mainly used for making drinking vessels, plates and other tableware. Another alloy of tin and lead is solder, used for joining metals.

(l) The most common method now employed is to filter and next to chlorinate water, so as to destroy bacteria. This is done

by passing a minute quantity of chlorine through a reservoir of water. This kills all bacteria and germs in the water.

(m) Argon, helium, neon.

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(n) The ptyalin and other enzymes that saliva contains help pre-digest food, especially the starches before it passes into the stomach.

(o) If air were not removed from inside a bulb there would be rapid oxidation of the electric filament and the tarnished filament would soon waste away.

Q. 22. Answer all the following :—

What facts or laws are illustrated by the following occurrences ? (e. g., if you open the valve of an inflated tyre, that the air rushes out illustrates the fact that the air, if free to do so, moves from a region of higher to a region of lower pressure).

- (a) When we pump up a tyre vigorously the pump gets hot.
- (b) Air escaping from a punctured tyre feels cold.
- (c) If a highly pumped up bicycle tyre is left in the hot sun it may burst.
- (d) Gubaras rise into the air.
- (e) In winter evenings and mornings mist or fog tends to collect in valleys.
- (f) It snows on high hills, while it rains lower down.
- (g) If you jump out of a moving train you will be carried forward in the direction of its movement unless you exercise some force to prevent this.
- (h) Moisture gathers on the outside of a glass of cold water on a warm day.
- (i) In the middle of a hot summer day the sides of a swimming bath burn your feet while the water feels cold ; whereas in the early morning the sides are cold and the water feels warm.
- (j) If you are sweating you feel cooler on a hot day than on a cooler moist day.

(National Defence Academy Exams. 1957)

Ans. (a) Friction produces energy. Now when we pump up a tyre vigorously we act vigorously against friction and thereby generate heat. The pump gets hot due to friction between its parts during the act of pumping.

(b) Because the fast escaping air from the puncture rapidly takes away heat from our finger.

(c) Because due to heat the air in the tyre may expand so much that the pressure of the expanding air on its sides may burst it.

(d) The *Gubaras* rise into the air on the principle that a lighter body floats over a comparatively denser body. The *gubaras* contain a gas lighter than air, hence they float in the air.

(e) In winter during morning and evening, it gets comparatively much cooler than during the day time, hence air particles suspended in the air in a valley get so much cooled that they appear as a fog or mist settling down in the valley. This process is accelerated by surrounding earth getting very quickly cooled during morning and evening.

(h) This is because the person who jumped from a fast moving train had already the momentum of the forward motion of the train on his body and hence unless he exerted force in the opposite direction he would be carried forward by the force of this forward momentum on his body.

(i) This is because solid bodies get hotter and colder more quickly than a large quantity of water, because solid bodies catch heat more quickly and give it up equally more quickly than water. For this reason the sides of a tank would feel very hot to a bather, during a summer day while the water would be cold to his feet. In the early morning, the solid sides of the tank, which gave up heat more quickly than water during the previous night would be feeling cooler than the water in the tank.

(j) If it is a dry hot day the sweat will evaporate quickly from our body and in this process so much latent heat of evaporation would be used up that our bodies will feel cool. If the dry air is replaced by moist air, the process of evaporation of the sweat will not take place, hence we will feel more stuffy even on a comparatively cooler but moist day than on a hot dry day.

Q. 23. (a) Where are any four of the following Indian Institutions ?

- (i) The Central Building Institute.
- (ii) The Central Fuel Research Institute.
- (iii) The Central Leather Research Institute.
- (iv) The Indian Agricultural Research Institute.
- (v) The Indian School of Mines and Applied Geology.
- (vi) The National Chemical Laboratory.
- (vii) The Tata Institute of Fundamental Research.
- (viii) The National Physical Laboratory.
- (ix) The Bose Research Institute.

- (b) From the following two lists choose any pairs of the correct place and product—

PLACE : Bundi, Ludhiana, Bangalore, Ahmedabad, Kolar, Hazaribagh district, Singbhum district, Digboi.

PRODUCT : oil, iron ore, gold, mica, telephones, cotton textile, hosiery and knitwear, cement.

- (c) Answer any four of the following :—

- (i) Name the best known game fish of the rivers of Kashmir.
- (ii) Name the best known game fish of the rivers of the upper Gangetic plain and the foothills of the Himalayas.
- (iii) Which of the following animals is or are carnivorous Elephant, camel, panther, wildbear, chita and monkey.
- (iv) What do we call a bird that spends part of the year in one part of the world and part in another ?
- (v) What birds visit northern India in great numbers during the winter ?
- (vi) What Indian timber was extensively used for ship-building in the days of wooden ships ?
- (vii) What do we call plants whose seeds are ground to flour and eaten by man ?
- (viii) What special property have leguminous plants ?
- (ix) Name the stage in the life of an insect between the larva and the imago.

(National Defence Academy Exams. 1957)

- Ans.** (i) Roorkee,
 (ii) Dhanabad,
 (iii) Madras,
 (iv) New Delhi,
 (v) Dhanabad,
 (vi) Poona,
 (vii) Bombay,
 (viii) New Delhi,
 (ix) Calcutta.

[Note—For different institutes in the country consult Dr. Bhatnagar's Hand Book of General Knowledge.]

- (b) Bundi. Cement.
 Ludhiana. Hosiery and knitwear.
 Bangalore. Telephones.
 Ahmedabad. Cotton textiles.

Kolar. Gold.

Hazaribagh district. Mica.

Singbhum district. Iron ore.

Digboi. Oil.

[For questions of this type consult Bharat Year Book].

- (c) (i) Trout,
- (ii) Rahu,
- (iii) Panther and Chita,
- (iv) Migratory,
- (v) The crow,
- (vi) Teak,
- (vii) Cereals,
- (viii) The leguminous plants have great food value, which is largely due to a protein, known as *legumin*, found in the seeds, which grow in their symmetrical pods.
- (ix) The stage between the larva and the imago (i.e., adult) is that of the pupa.

Q. 24. Write down the answer to any ten of the following questions :—

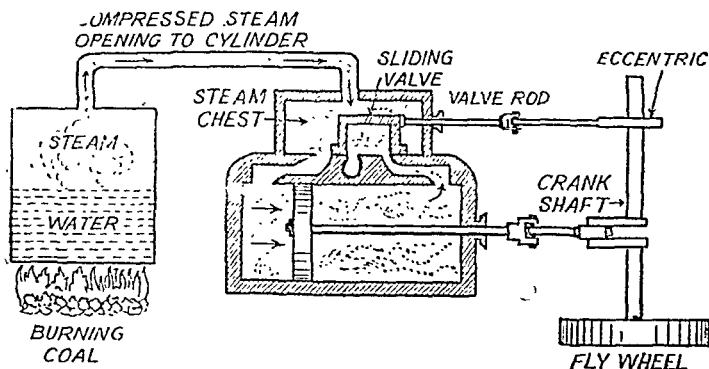
- (a) Who invented the phonograph ?
- (b) Who is supposed to have first measured the circumference of the earth ?
- (c) Who is usually credited with the invention of the telescope ?
- (d) Who was the Italian physicist who discovered that when you touch the ends of the nerves of a dead frog with two dissimilar metals they cause muscular contraction ?
- (e) Who is credited with the invention of the steam engine ?
- (f) Who was the Italian physicist who discovered that copper and zinc in dilute sulphuric acid generate an electric current if the outer ends of a metal are connected by a wire ?
- (g) Who made radio communication a practical proposition ?
- (h) Who first found the medicinal properties of penicillin ?
- (i) Who invented the jet engine ?
- (j) What type of heavenly body is the sun ?
- (k) What type of heavenly body is the earth ?
- (l) What type of heavenly body is the moon ?
- (m) Name the towering clouds that it is dangerous for an aeroplane to fly into.
- (n) What instrument is used for recording earth tremors ?
- (o) Name the rays of the same velocity as light but with a wavelength just shorter than visible light rays.

- (p) Name the vaccine that gives protection against tuberculosis.
- (q) Name the disease of the liver that causes a patient to turn yellow.
- (r) What is the disease that statistics appear to show is more common among those who smoke cigarette than among those who do not?
- (s) What was the method in surgery largely developed by Lord Lister?

- Ans. (a) Edison,
 (b) Ptolemy,
 (c) Hans Lippershey,
 (e) Watt,
 (f) Volta,
 (g) Marconi,
 (h) Sir Alexander Fleming,
 (i) Frank Whistle,
 (j) It is a star,
 (k) It is a planet,
 (l) It is a satellite,
 (m) Cumulonimbus clouds (Its uprush sometimes exceeds 200 ft. per second and this is dangerously rapid for any aeroplane.)
 (n) Seismograph,
 (o) Ultra-violet rays,
 (p) B. G. G.
 (q) Jaundice,
 (r) Cancer,
 (s) Anti-septic surgery.

Q. 25. With the help of a diagram; describe the working of a steam engine. (About 15 lines)

Ans.



As shown in the figure a large quantity of burning coal below

a chest, called the boiler, converts the water in the boiler into steam. This steam is conducted into a **steam chest** (as shown in the figure) within which a *sliding valve* moves back and forth according to pressure it receives on one side or the other side. This sliding valve controls the admission and expulsion of steam. The sliding valve is connected as shown in the figure with a rod, which may be called the valve rod and this in its turn is controlled by the off centre motion of an *eccentric* as shown in the figure. This eccentric is connected by means of a crankshaft with a connecting rod, which in turn is connected to a piston rod which moves to and forth in a close cylinder.

Compressed steam as it enters the steam chest pushes first against one side of the piston and drives it backward and when the stroke is about to be completed, the valve closes the incoming steam which gets out through an opening valve called the exhaust valve. Now the pressure on the piston comes from the other side, so that the piston goes again to the other side and thus this motion of the piston to and fro continues.

The piston rod connecting rod and crankshaft act together to produce rotary motion from the back and forth motion of the piston. It is this rotary motion that is made use of. A flywheel is added to provide the inertia for smoothness of operation.

Q. 26. (a) State Ohm's law and describe an experiment to verify it.

(b) Given two convex lenses of focal lengths 16 c. m. and 4 c.m. respectively. How may the lenses be arranged to form a telescope? Determine also the magnification of the telescope.

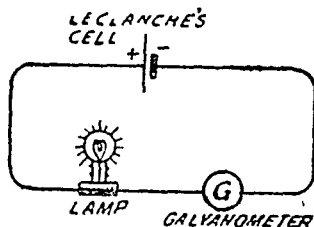
(Military College Exam. 1957).

Ans. (a) Ohm's law states that an electric current varies directly as the electromotive force and inversely as the resistance.

Expressed as formula it is $C = \frac{E}{R}$

Experiment.

As shown in the first figures let an electric current from a Leclanché cell flow through a conductor of copper wires which is made into a circuit containing a small torch electric lamp and a galvanometer. In this circuit the cell drives the electric current by its electromotive force and the lamp with any other resistance tends to oppose the flow of the current. A condition of equilibrium is set up and a



constant current is sent through the circuit, as indicated by the galvanometer connected in the circuit. If instead of one lamp two lamps are connected as shown in the other figure, it is found that the current passing through the circuit, as shown by the galvanometer becomes much less than what

it was with the single lamp.

If now instead of using the torch electric bulbs we use a thin iron wire of one metre length, and next a wire of two metres length and the galvanometer reading is taken we will find that the electric current is now much less than what it was before. If instead of one cell we connect two in a series, the current will at once become stronger.

If the difference of potential between the ends of the conductor is E and the current flowing through the circuit is C , and if the physical conditions such as temperature do not change then according to Ohm's law stated above we will find that

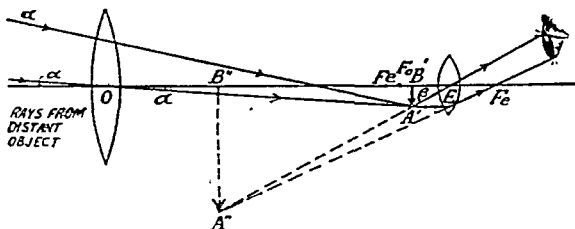
$$\frac{\text{The potential difference between ends of conductor}}{\text{Current flowing through the conductor}} = \text{Resistance}$$

$$\text{or } C = \frac{E}{R}$$

(b) In a telescope, magnifying power

$$= \frac{\text{focal length of the objective lens}}{\text{focal length of the eye piece}} = \frac{16}{4} = 4.$$

The two lenses may be arranged as shown in the figure here.



Q. 27. (a) Separate quantities of calcium carbonate each in fine powder are submitted to (i) strong heat (ii) action of dilute hydrochloric acid (iii) action of the solution of carbon dioxide in water. State what happens in each case.

(b) Define the following terms giving an example in each case (i) Oxidation (ii) reduction (iii) neutralization (iv) acid oxide (v) basic oxide.

(Military College Exam. 1957).

Ans. (a) (i) With strong heat calcium carbonate is dissociated into calcium oxide and carbon dioxide.

(ii) When dissolved in hydrochloric acid a solution of calcium chloride CaCl_2 is formed.

(iii) The action of a solution of carbon dioxide in water on calcium carbonate is to cause the formation of a bicarbonate

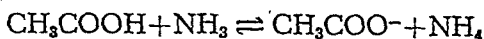


(b) (i) **Oxidation** is the term applied to a chemical change whereby oxygen is added to an element or compound. Thus iron is oxidised by the oxygen in the air to form rust.

(ii) **Reduction** is the process in which oxygen is removed from a compound. Thus when lead oxide is heated over charcoal, metallic lead is left and the oxide is said to have been reduced.

(iii) **Neutralization** is a chemical reaction which occurs when equivalent quantities of an acid and a base (other than water) are mixed.

Example



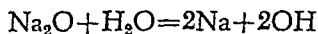
(iv) When an oxide on combining with water forms an oxide which turns blue litmus red it is an acid oxide

Example



(v) When an oxide on combining with water forms a base which turns red litmus blue it is a basic oxide

Example



Q. 28. (a) How is malaria caused and how can it be prevented and cured?

(b) Draw a diagram showing the circulation of blood in the human body. Indicate also the position of important internal organs. (Military College Exam. 1957).

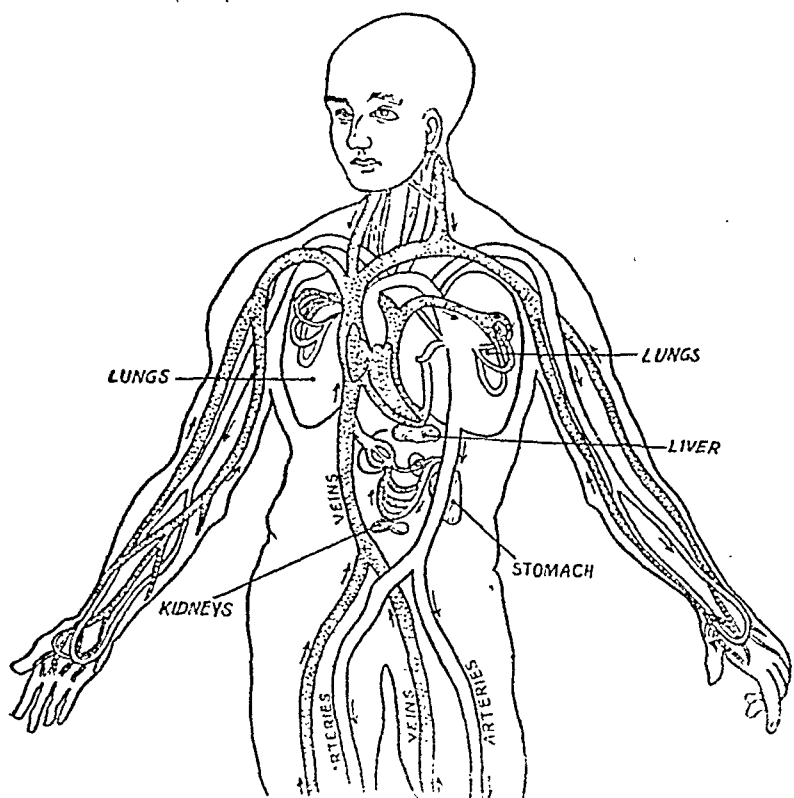
Ans. (a) Malaria is caused by the bite of the anopheles mosquito whose saliva contains the malarial parasites. A parasite completes its first cycle of life in the mosquito and after the bite of a human being the second part of its life cycle in the human being is completed.

In the human blood the parasites grow and eventually burst out into a host of small bodies. This brings about the ague which may occur daily or every second or third or fourth day.

Formerly quinine was regarded as the only remedy against malaria but other drugs have been prepared which are even more effective. Most well known of these are: Plasmoquine, atabrine, mepacrine, chloroquin.

The best prevention is the destroying of the anopheles mosquito that carry the malarial parasite. This can be done by covering the cesspools of water in which the mosquito breed in an malaria infected area with kerosine oil (2) Using mosquito nets at home while lying on bed (2) Clearing up the whole neighbourhood of standing water so that mosquitoes do not breed.

(b) As shown in the figure veins carry blood from various parts of the body to the heart, while arteries carry it from the heart to various parts of the body.



Q. 29. Write short notes on any five of the following (3 or 4 lines each.)

- (a) (i) Kangaroo.
- (ii) Rubber.
- (iii) Priaries.
- (iv) Yak.
- (v) Canton.
- (vi) Trans-Siberian Railway

(vii) Sargossa Sea.

(viii) Graft.

(b) Mention the achievements of any five of the following :—

(i) Rutherford.

(ii) Newton.

(iii) Galilio.

(iv) Pasteur.

(v) Gauss.

(vi) Hahn.

(vii) Roentgen.

(viii) Maxwell.

(Military College Exam. 1957).

Ans. (a) (i) Kangaroo is a vegetarian animal of Australia. The front limbs are small, while the hind limbs are long and powerful and allow the animal to leap swiftly over the ground. It has a pouch in its belly for its young.

(ii) Rubber is the dried juice or secretion of various tropical plants where rain is abundant. Its elasticity, toughness, impermeability, adhesiveness and electrical resistance makes it useful as adhesive, coating fibre, and as a molding compound and electrical insulator. Extensively used as rubber tyres.

(iii) Prairies are level grass covered treeless plains of U.S.A. and Canada.

(iv) Yak. It is a kind of ox found wild in the plateau of Tibet. It has long black hair. When domesticated it yields milk, butter, meat etc. Its hair is spun into tent coverings and cloth.

(v) Canton is a city of South China on Canton river. It is one of the most flourishing of ports and had formerly extensive trade with Europe. It is a great manufacturing centre also.

(vi) Trans-Siberian Railway. This railway in Siberia is the sole E. to W. transport artery in this territory of the U.S.S.R. It is the longest railway line in the world being fully 6,000 miles long. It connects Moscow with Valadivastok port in the far east part of the U.S.S.R.

(vii) The Sargossa Sea is an area of still water in the north Atlantic, N.E. of the West Indies. It is largely covered with sea weed.

(viii) Graft. This term means (1) the method of joining parts of two plants so that the tissues grow together, becoming one (2) in plastic surgery human skin, bone etc. may be successfully grafted one to the other if the tissues are compatible.

(b) (i) Rutherford. He contributed greatly to knowledge of structure of atom. His main researches were in the field of radio-activity.

(iii) Newton. He is well known for promulgating the three laws of motion which bear his name. He also invented the binomial theorem and the differential and integral calculus. He also

discovered the composition of white light and added greatly to world's knowledge of Optics.

(iii) **Galileo** discovered the laws of freely falling bodies and the pendulum. He made the first thermometer and astronomical telescope. He is known as the father of experimental science. His discoveries and inventions are in fact among the most important ever made.

(iv) **Pasteur**. This celebrated French chemist discovered the causes of fermentation in alcohol and milk and proved that the organisms stimulating them are contained in the atmosphere. He invented by these researches the method of preservation called pasteurization. He also discovered treatment for hydrophobia.

(v) **Gauss**. He contributed to topology, astronomy and physics and did original work in the field of non-Euclidian geometry. The Gauss unit of intensity of the magnetic field is named in his honour.

(vi) **Hahn**. This German scientist was the first to split the Uranium atom and discovered possibility of chain reaction. The atom bomb was based on his work.

(vii) **Roentgen**. Roentgen is famous for his discovery of the X-rays which have helped surgeons to locate extraneous matter in human flesh and bones and thus make safe and successful operations.

(viii) **Maxwell**. His fame rests on his rigorous formulation of electromagnetic field theory and the theory that light is electromagnetic in nature. He also published papers on colour vision and colour blindness, and the nature of Saturn's rings and on the kinetic theory of gases.

Q. 30. Into what zones can Russia be divided according to climate and vegetation? Give characteristic products of each (about 15 lines) (Military College Exam. 1957)

Ans. Due to its vast area Russia (and for that matter the U. S. S. R.) has a vast range of climate. It may however for purpose of describing its climate be divided into the following four broad regions:—

1. The European Plain. 2. Western Siberian Basin. 3. The Turanian Basin or Soviet Central Asia. 4. Eastern Siberia.

1. This region is affected in the N W. by the warm Gulf stream and by Atlantic cyclones in the W. & N. W. bringing storms, clouds and changeable weather. It is fairly hot in summer but extremely cold in winter.

2. In this region winters grow, longer and more severe, spring comes late and summer are short.

3. This region is open to cold north winds. Winters are extremely cold and summers are the hottest. Rainfall is very scanty.

4. Extremest continental climate in this vast area. Generally

it is the coldest part of Russia. Winter is extremely cold falling as low as -58°F . at Verkhoyansk, but summer is fairly hot. July temperature at Verkhoyansk reaches 60°F .

Vegetation. It may be divided into five main regions.

1. Tundra 2. Forest 3. Steppe 4. Semi-desert 5. Desert.

1. In the Tundra only mosses and lichens grow.

2. Vast areas, specially the greater part of Siberia are covered with forest. The chief trees are spruce, pine, larch, white fir and cedar.

3. The steppes are to the south of the forest zone. They are treeless except in river valleys.

4. The Semi-Desert and Desert areas. These are chiefly between the Kazakhstan hills and mountains to the south.

The best portion is the region round the Crimea where extensive wheat fields are situated.

Q. 31. What do you understand from the 'mountain,' the 'plain' and the 'delta' stages of a river? Illustrate your answer by reference to some Indian river. What class of river cannot form a delta? (about 20 lines) (Military College Exam. 1957)

Ans. In the first or the "mountain" stage, a river is formed by melting of a glacier, as the sacred Ganga issues from the Gangotri glacier at a height of 13,800 ft. in the Himalayas. Coming from a great height the river is swift and has many cataracts and passes through many narrow gorges which it has cut deep in course of time. It brings with it large boulders and small pebbles which it has repeatedly cut and rounded by continuous concussions among the pebbles themselves and the resulting sand. When there are heavy rains it is very turbid and carries much silt with it. It is also joined by other small streams that flow from adjoining river valleys. Thus the Ganga is joined by the Ghaghra, the Gandak, the Kosi, the Son, Bet etc.

The swift flowing mountain torrent that a river is, is checked abruptly as it emerges from the hills and spreads out over a shallow bed. The Ganges is thus checked this way as it emerges from the Siwalik range on the plain at Hardwar and spreads out over a shallow bed more than a mile wide. When there are no rains the river flows smoothly in its course and is clear of all silt, but during the monsoon seasons, the huge silt it carries is spread over the vast dead level plain, which it floods. The vast alluvial Gangetic plain has thus been formed by the heavy mud brought to the plains by the main river and its tributaries.

Near its mouth, as it is about to pour its water into the ocean, the silt is deposited and this forms a big delta. It is about 200 mile in the case of the Ganga.

A delta is formed when the speed of a river current falls on meeting the still waters of a lake, a sea or the ocean, for the latter

cannot carry away to a great distance the heavy silt the river has brought and which therefore falls down as a precipitate.

A delta on a river is not formed if the current is swift and the silt is very small or when the ocean into which it falls has very heavy tides, which carry the silt far away.

Q. 32. What are the following ? (3 or 4 lines each)

- | | |
|-------------------------|-------------------|
| (a) Phases of the moon | (f) Snow line |
| (b) Tides | (g) Frost |
| (c) Geysers | (h) Trade winds |
| (d) Eclipse of the moon | (i) Belt of calms |
| (e) Artesian well | |

(Military College Exam. 1957)

Ans. (a) If we were to watch the moon night after night we would see it assuming different shapes, sometimes it is a crescent, then a half moon and after a few days the full moon and then it again begins to wane till it becomes a crescent and then almost disappears. These are called the phases of the moon.

(b) Tides are the movements of waters of oceans caused by the single or combined attractions of the moon and the sun.

(c) Geysers are geological formations from which hot water and steam erupt explosively, usually at fairly regular intervals. Deep under-ground water under considerable pressure is heated by underground rock and this comes out at intervals to the surface.

(d) Eclipse of the moon. If the moon passes into the shadow cast by the earth intercepting the light of the sun, an eclipse of the moon occurs. As the moon is a dark body like the earth, it shines by reflecting part of the light of the sun, hence when the earth intercepts this light the moon is eclipsed.

(e) Artesian well. It is a well sunk into permeable stratum which has impervious strata above and below it. The water percolates into the permeable strata from places higher than the place at which the well is sunk. The water in the well comes out by hydrostatic pressure.

(f) Snow Line is the line in a mountain above which snow remains perpetually on the mountain.

(g) Frost. When the climatic condition is such that the temperature of the atmosphere falls below 32°F , the water on the earth's surface, plant juices etc., freezes, it is frost.

(h) Trade winds are winds which blow almost continuously in the tropical seas. North of the Equator they have a south-westerly direction and are called N. W. winds while south of the Equator they blow towards the N. W. and are called the S. E. winds. The Monsoons are trade winds.

(i) Belt of calms. This region, also called the doldrum is the region of calm weather at sea, just north of the equator on the confines of the trade winds. These calms last for weeks at a time.

Q. 33. Explain briefly in about five lines each why ?

(a) As we travel round the world westwards we have to put back the clock continually.

(b) Before going up in an aeroplane, we are advised to empty the ink from our fountain pen.

(c) In summer we prefer to use white clothes.

(d) Electricians wear rubber gloves.

(e) A thick glass tumbler cracks when boiling water is poured into it.

(I. A. S. (Special Recruitment) Exam. 1956)

Ans. (a) Since the earth revolves round itself in 24 hours, and this revolution is in the direction of west to east there is a difference of 1 hour for each 15° of longitude. When it is 12 o'clock at a place x, it is 11 o'clock at the same time at a place y 15° long. westward so that if we start from the place x westward at 12 o'clock noon and arrive at y an hour afterwards the clocks at y will show 12 O'clock while our clock will show 1 p. m. We will have therefore to put ours back by one hour to tally our clock with the local time. We will thus have to put our clock back 4 minutes for every 1° longitude we travel westward.

(b) Our fountain pen was constructed on the earth under normal atmospheric pressure, so that its tube containing the ink has the same atmospheric pressure outside it, as inside. When we go up in an aeroplane, the atmospheric pressure goes on decreasing. This causes the air surrounding the sealed tube to squeeze the tube and consequently squeeze out the ink in it by the greater pressure it exerts round the tube than is exerted by the rarefied atmosphere inside the tube hence the ink is likely to flow out when the aeroplane rises. For this reason we are advised to empty the ink from our fountain pens. Also, the rarefied upper atmosphere cannot hold ink inside the tube, hence the ink will flow out.

(c) White clothes are good reflectors of heat and light and consequently bad absorbers of them, hence they are cooler to wear in summer than coloured clothes which would absorb the heat more readily than the white ones, and would therefore be more stuffy on wear.

(d) Rubber is a bad conductor of electricity, hence rubber gloves will not allow electricity to pass to the body, thus it will save the hands from receiving shock of the current passing through the wires which electricians have to handle.

(e) A thick glass tumbler cracks when boiling water is poured into it, because the boiling water imparts great heat to the inside of the tumbler which expands, and as glass is a bad conductor of heat, the outer surface remains comparatively cooler

and does not expand as much as the inside surface. Hence due to the greater outward pressure of expansion of inside glass it cracks.

Q. 34. Explain the following :—

(a) Blood group. (b) Carburettor. (c) Short circuit. (d) Kinetic energy. (e) Short sight. (I. A. S. Exam. 1956)

Ans. (a) Blood groups are sections of population, distinguishable by differences in blood. Blood characteristics enable doctors to make such distinctions. They have now been divided into four distinct groups, called O, A, B and ab. It has been found that blood transfusion from an incompatible donor (i. e., whose blood is opposed in character to that of the recipient) causes clumping of cells of the recipient, producing severe reactions and even death. Therefore each group can receive from and give blood to the same group. Thus A and B are incompatibles, but ab can receive all groups, while any one can receive O blood.

(b) Carburettor is that part of an internal combustion engine that regulates the flow of liquid fuel to the cylinders and also by blending the liquid with a suitable quantity of the air passing into the cylinders, turns the liquid fuel (e. g., petrol) into a suitable explosive mixture, so that it gets easily ignited by a spark.

(c) Short Circuit. A circuit is the path through which an electric current flows. When through an accident that circuit gets shortened, as by fusing of wires in an electric wiring system, there is at once an overloading of electricity which may cause a fire. Such a circuit is called a short circuit.

(d) Kinetic energy is the energy which a body possesses as a result of its motion and by virtue of which it is able to do work. A brick thrown on the ground from a table possesses kinetic energy due to which it may break to pieces a glass tumbler on which it may happen to fall. When it lay on the table it possessed no such energy.

(e) Short sight. An eye is said to possess short sight when it cannot see distant objects clearly. In this case the eye-ball is usually too long, so that the parallel rays coming from a distant object are brought to a focus in front of the retina. The object will become well defined only if the rays of light are made to converge less rapidly, i. e., at a greater distance. This is done by placing before the eye a lens that will diverge the rays till they fall on the retina. This is done by means of a concave lens which is thinner at the middle than at the edges, and hence diverges the rays of light.

Q. 35. Answer any five of the following :—

- (a) How would you start a fire if you had no matches ?
- (b) Of what are lead pencils made ?
- (c) Why is one's breath visible in cold, but not in hot weather ?
- (d) What bird never builds its own nest ?
- (e) How long does it take for the light to reach the earth ?
- (f) What is the normal temperature of the human body ?
- (g) Why does mercury rise in a barometer ?
- (h) What is the function of the radiator in a motor car ?
- (i) What is the chemical composition of a diamond ?

(I. A. S. Exam. 1956)

Ans. (a) (i) By vigorously striking pieces of flint and holding cotton or paper or any substance that easily catches fire.

(ii) By rapidly twirling a pointed piece of wood in a wooden box and putting loose cotton in the box. Friction would generate heat till ignition point is reached for the cotton to catch fire.

(iii) A convex lens may be held before the sun and a piece of paper held at its focus. The concentrated rays of the sun at the focus will char the paper which will at once catch fire.

(b) Lead pencils are made of graphite, a form of carbon.

(c) The hot moist particles in one's breath get at once condensed in the cold in winter and they therefore appear as a mist. In summer or hot weather, no such condensation can take place, and hence the breath remains invisible.

(d) The cuckoo.

(e) About $8\frac{1}{4}$ minutes.

(f) $98\frac{1}{2}^{\circ}$ Fahrenheit.

(g) Due to the pressure exerted on the surface of the mercury by the atmosphere.

(h) The radiator serves as the engine cooling apparatus in a motor car.

(i) Diamond is nothing but pure carbon crystallised.

Q. 36. What do you understand by the following ? :—

(a) Artificial silk, (b) The Grid, (c) Alloys, (d) Radar, (e) Pituitary ?

(I. A. S. Exam. 1956)

Ans. (a) Artificial silk, also called rayon, is made from cellulose obtained from wood pulp or cotton linters. The modern

method consists in treating cotton linters with an excess of acetic anhydride and acetic acid, the end product being cellulose acetate. This is then dissolved in acetone and the product is forced through tiny holes so as to form fibres. These are chemically treated and wound on bobbins for textile manufacturers.

(b) **The Grid** is the name given to one of the electrodes of the triode valves used in the wireless apparatus.

(c) **Alloy**. An alloy is a blending together in a molten state of a metal with one or more metallic (or non-metallic) substances. Examples : Brass, Bronze.

(d) **Radar** is the process of locating the position of an object in space by radio waves without any active co-operation on the part of the object.

It depends on the principle that all solid and liquid bodies reflect radio waves, which are uninfluenced by darkness, clouds or fog. Therefore to detect the object, the object is flooded with radio waves and ground detectors are used to pick up the reflected beam. It is then possible to detect the direction of arrival of the reflected waves and the direction of the radio located object with respect to the ground station. The distance along that direction may also be determined by timing the journey of the radio waves to the reflecting object and back. Radio waves, like light waves, travel with a speed of 186,000 miles per second ; they travel therefore to and fro from an object 100 miles away in about one-thousandth of a second. It is the accurate and speedy measurement of time intervals of this order which is the basic feature of the radio measurement of distance.

(e) **Pituitary**. The pituitaries are ductless glands at the base of the brain secreting a number of hormones. Their secretion promotes growth, controls fat distribution and utilization, protein metabolism, the amount of blood sugar, the growth of the thyroid, the parathyroid and the adrenal glands. The pituitaries also control the growth of male sex characteristics and milk production in the mammary glands of women.

Q. 37. What are the following ? :—

(a) **Penicillin** (b) **Dynamo** (c) **Mensuration** (d) **Prime Numbers**
(e) **Isotopes** and the process involved in (f) **Atrophy** (g) **Refrigeration**
(h) **Fermentation**. (I. A. S. Exam. 1956)

Ans. (a) **Penicillin** is an antibiotic obtained from the bread mould, *Penicillium Notatum*, used in treating pneumonia, meningitis, bone infection, tonsillitis, syphilis, gonorrhea, heart disease of infectious origin, scarlet fever, boils, abscesses, anthrax etc.

(b) A **Dynamo** is a machine that converts mechanical into electrical energy by using the principle of electro-magnetic induc-

tion. It consists of two major parts, one is the revolving armature, called the *rotar*, the other is made of stationary field magnets called the *stator*. The revolving armature consists of coils of wire which rotate between two magnetic poles (the *stator*). As the turning coil cuts magnetic lines of force, electric current is generated in the coil from which metal strips (called the *brushes*) lead current into a closed circuit, for putting the electric current generated to use.

If the turning coil cuts lines of force first in one direction and then in the opposite direction A. C. or alternating current is produced. If a one direction, i. e., direct current (D. C.) is sought to be produced this is done by using a device called the *commutator*.

(c) **Mensuration** is the branch of mathematics concerned with the measurement of lines and figures, e. g., of straight lines, circles, triangles, ellipse, pyramids and spheres.

(d) A **Prime number** is a number which has no factor other than itself and thus 3, 7, 11, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61 etc., etc., are all prime numbers.

(e) **Isotopes** are two or more forms of the same chemical element which have the same atomic number and consequently the same chemical properties but different atomic weights. Thus deuterium D or heavy hydrogen is an isotope of hydrogen, with an atomic weight 2, whereas that of hydrogen is 1. Similarly U--235, U--238, U--239 are isotopes of uranium.

(f) **Atrophy** is the wasting and diminution of size of an organ, e. g., a muscle, a gland or a nerve leading to loss or reduced function. This is due to interference with the nutritive processes. This state arises from a number of causes, including disease, pressure or interference with the supply system or due to an organic disease.

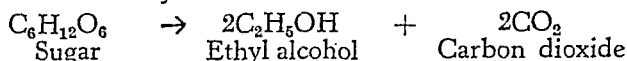
(g) **Refrigeration**. This is the production of low temperatures by mechanical methods. Among the substances having the physical property of changing their state from liquid to gas and vice versa and in this process produce low temperatures are ammonia, carbon dioxide, sulphur dioxide, methyl chloride, freon which are in wide use.

Mechanical refrigeration depends on the principle that an expanding gas drops in temperature and can thus cool its vicinity. A machine consisting essentially of a compressor (or a pump), a condenser, regulating valve and evaporator maintains a cycle of compression and expansion of the refrigerant till a very low temperature is reached.

(h) **Fermentation** is the slow process of decomposition of animal or vegetable substances produced either by micro-organism or by

enzymes. Thus lactic acid is produced by fermentation of milk, beer and wine by the fermentation of starches and sugar of fruit.

Thus, for example, the process involved in the conversion of sugar to alcohol by the complex group of enzymes called zymase contained in various yeasts is as follows :—



Q. 38. Answer the following :—

What is :—

- (a) (i) The age of the earth. (ii) The practical unit of current.
(iii) The purest form of water in nature. (iv) The rain making clouds.
(v) Direction guides in the earliest form of navigation.

(b) For what are the following instruments used ?

- (i) Seismograph (ii) Chronometer (iii) Mariner's compass.
(v) Hydrophone. (Indian Navy Exam. Dec. 1956)

Ans. (a) (i) Data obtained from radio-active rock indicates that the earth is at least 1,260,000,000 years old and may be twice that age. (ii) Ampere (iii) Rain water in the country side. (iv) Clouds which are formed by winds like the monsoons, passing over great ocean masses and are full of water vapour. When they reach heights where they cool, the condensation appears as rain water. (v) Loadstone, a natural magnetite, was used as a compass for direction in the earliest forms of navigation.

(b) **Seismograph** : Recording earth tremours.

Chronometer : Instrument for measuring exact time, specially used in navigation.

Sextant : Instrument used in ships to determine longitude and latitude.

The Mariners' Compass : It is used for finding direction at sea.

Hydrophone : For listening to sound transmitted through water.

Q. 39. (a) At what temperature does the Fahrenheit thermometer give the same reading as the centigrade thermometer ?

(b) When it is noon at a certain place the time at Greenwich is known to be 6-20 P. M. What are the longitude of the place ?

(c) What are the chief constituents of air ?

(d) What are the earth's motions and what are their chief effects ?

(e) Name the organs of the digestive system in the human body ?

(f) What is allotropy? What are the allotropic modifications of carbon? (Indian Navy Exam. Dec. 1956)

Ans. (a) At -40° .

(b) For every 15° longitude there is a difference of 1 hour. Therefore for a difference of 6 hours 20 minutes, the difference of longitude is $6 \times 15 + \frac{2}{3} \times 15 = 95^{\circ}$. The longitude of the place is 95° .

(e) The chief constituents of the air are nitrogen (78.09 %), oxygen (20.95), and small amounts of argon, carbon dioxide and other rare gases. Water vapour is always present in varying quantities.

(d) The earth has three motions. (1) Round the sun in an elliptical orbit (called the "ecliptic"), which takes approximately $365\frac{1}{4}$ days to complete. This motion round the sun makes our solar year.

(2) It spins round itself, making the complete spin in 24 hours. This makes our days and nights.

(3) The axis of the earth is inclined at an angle of $23\frac{1}{2}^{\circ}$ from the true verticle to the ecliptic, and this with its tilt gives rise to the phenomenon of the seasons. Due to the tilt at one point in the course of its revolution round the sun, the tilt of the axis is such that the northern half of the hemisphere is inclined towards the sun, at another time the southern half. The hemisphere which is tilted towards the sun receives the rays more directly, and the warmer season is the result, while in the other half it is winter. At the equinoxes, the tilt of the axis is across the rays of the sun and then we have equal days and nights.

(e) The Alimentary canal beginning at the mouth and ending at the anus is our digestive system. It comprises the mouth, the pharynx, oesophagus, stomach, the large and small intestines called the bowels and ends in the exit passage called the anus.

(f) Allotropy is the phenomenon of a chemical substance being found in two or more forms quite different from each other. Thus ozone is an allotropic form of oxygen. Charcoal, lamp black, graphite and diamond are allotropic forms of carbon.

Q. 40. What do you understand by the following? :—

(a) Horse Power

(b) Plaster of Paris

(c) Tincture of Iodine

(d) Electric Relay

(e) International date line. (Indian Navy Exam. Dec. 1956)

Ans. (a) "Horse-power is the unit of measurement of the rate

of doing work or supplying energy." This equals to doing 33,000 foot-pounds weight of work per minute.

(b) **Plaster of Paris** is a paste formed by removing the water from gypsum or calcium sulphate dihydrate.

(c) **Tincture of Iodine** is a solution of iodine, potassium iodide, alcohol and water.

(d) **Electric relay** "is the process in telegraphy and in wireless to secure reception of signals over a great distance by causing a faint signal (electric current or wireless wave) to control a more powerful force and relay a more powerful signal".

(e) **International date line.** It is, by general agreement, the place where each calendar day begins. It is a modification of the 180th meridian. At that meridian the date is put forward a day when crossing the line going west and back a day when going east.

Q. 41. Why are the following so called ? :—

(a) Aqua Regia,

(b) Pasteurization,

(c) Plutonium,

(d) Mount Everest,

(e) Radar,

(f) Heavy Water ?

(Indian Navy Exam. Dec. 1956)

Ans. (i) It is so called because it is the only mixture of acids (except silenic acid) that would dissolve the noble metals : silver, gold and platinum.

(ii) This is the process for destroying the majority of the micro-organisms in food, especially milk. It is called pasteurization—named after Louis Pasteur—because it was Pasteur who first introduced this process.

(iv) **Mount Everest** was named after Sir George Everest who was the Surveyor-General of India when it was discovered.

(v) **Radar** is name for the technique of radio location. During World War II the Radar came into general use, which may be interpreted as standing for the phrase Radio-Angle Direction and Range.

(vi) **Heavy water** has been so called because it has been formed by the combination of heavy hydrogen with oxygen,

Q. 42. (a) (i) Distinguish between hard and soft water,

(ii) Diastolic and systolic blood pressure.

(iii) Mass and weight.

- (b) (i) How does vaccination prevent spread of small pox ?
 (ii) What is gun powder ?
 (iii) How would you give a gold coating to a silver cup by using electric current ? (Indian Navy Exam. Dec. 1956)

Ans. (i) Water is said to be hard when it will not easily lather with soap. It usually contains salts of calcium or magnesium, principally the bicarbonates and the sulphates. Water is said to be soft when unlike hard water it lathers easily with soap. It does not contain the kinds of impurities the hard water contains.

(ii) The chambers of the heart continuously open at one stage and contract at the next to receive and force out blood.

When during its contraction movement the heart pumps out the blood through its expulsive chambers, the ventricles, so that from the right side the blood is being sent to the lungs and from the left side to the whole of the rest of the body, through the big artery called the aorta, it performs in this process what is called the **systolic blood pressure**.

During the resting period of the heart muscles (the diastole i.e. during the relaxation of ventricles) blood enters from the auricles into the ventricles. This blood pressure is said to be **diastolic blood pressure**, i.e., the blood pressure during the resting period of the heart, though the whole cycle (systole and diastole) lasts about four-fifths of a second.

(iii) **Mass** is the measure of the **quantity of matter** in a body. It is distinguished from **weight**, in that the latter is the **force of gravity or pull** upon the body.

(b) (i) Vaccination is the intravenous injection of the small-pox vaccine into the blood stream of a person. It prevents the spread of pox, because it gives the power of resistance to the persons into whose bodies the vaccine has been injected.

(ii) Gunpowder is a mixture of approximately 75% saltpetre, 15% charcoal and 10% sulphur.

(iii) This is done by the method called electro-plating. In this process, to give a gold coating to a silver cup, an electric current should be arranged to flow from gold immersed plates (the anodes) to the silver cup to be plated, through a gold metallic solution. The anodes are slowly dissolved in the electrolyte. The gold ions will be attracted to the silver cup and these give up their electric charges and deposit themselves on the surface of the silver cup, thus giving a gold coating to the silver cup.

Q. 43. Answer the following :—

- (a) How do you know that the earth is round ?
 (b) What is an internal combustion engine ? What are its four strokes ?

- (c) Why does a ship float on water ?
- (d) What are the five essential parts of the human eye ?
- (e) What are Ports and Enterpots ?
- (f) What are spring and neap tides ?

(Indian Navy Exam. Dec. 1956)

Ans. (a) The following are the arguments for supposing that the earth is round.

(i) The hull of a ship sailing away from us on the seas will first disappear, next middle part and last of all its topmost, and vice versa. If a ship is sailing towards us, we will see first its top, next its middle part as it approaches us and last of all its hull. This is possible only if the earth is a round ball. If it were flat, the surface of the ocean will also be flat and we will see the whole of the ship all at once.

(ii) The shadow of the earth on the moon is always round.

(b) An internal combustion engine is an engine in which fuel is burned in the cylinders. In such an engine the heat addition is effected by introducing gaseous, liquid or solid fuel. Examples are : (1) Motor engine in which petrol is used, (2) Diesel engine in which heavy oil is used, (3) Gas engine in which coal gas or a similar gas is used.

In the internal combustion engine the cylinder carries (1) inlet and exhaust valves to control admission of the fresh charge and to exhaust the products of combustion and (2) a sparking plug. The complete cycle of the whole process consists of four piston strokes occupying two crankshaft revolutions. In the first induction stroke the piston draws in a homogenous mixture of air and gas or air carburetted with petrol vapour and the cylinder pressure is slightly less than atmospheric. The second is the compression stroke, when the mixture gets compressed and both valves get closed. The third is the expansion (power) stroke, the compressed mixture is fired by a spark at the ignition plug at or slightly before the inner dead centre of the piston and the gas pressure rises to a peak value at nearly constant volume and the work is done on the piston during the subsequent expansion. The fourth is the exhaust stroke, when the combustion products are expelled through the open exhaust valve.

(c) Because volume for volume the weight of the ship is less than the weight of the water it displaces, hence the ship floats.

- (d) 1. The tough outer layer or the sclerotic coat which in the front forms the transparent cornea and the white of the eye.
- 2. The choroid coat, which underneath the cornea forms the iris, which has the pupil in the middle.

3. The transparent crystalline lens directly behind the iris, through which pass the rays of light to the retina.
4. The retina, which is the inner lining of the eye and forms the most important part of the eye, for this nervous cell net is highly sensitive to light and transmits impressions of light through.
5. The optic nerve which carries these impressions to the brain to be interpreted there.

(e) A port is a city or town on a sea shore where ships are loaded for carrying goods to other countries and where ships bringing goods from other countries are unloaded.

Entrepots are store-houses for deposit of goods, specially in the same harbours to be passed on to other countries without opening them, i.e., exactly as received, while profit is made on these goods in the process of re-export.

(f) When both moon and sun are on the same side of the earth, as at new moon, the lunar and solar tides are heaped one on the other and a very high tide is formed. This is called **spring tide**.

When in other positions the two forces act against one another, specially when they are diametrically opposed, a very small tide results. This is called a **neap tide**.

Q. 44. (a) Write the word mixture or compound against each of the following :—

(i) Water (ii) Air (iii) Sugar.

(b) Name the two oxides of hydrogen.

(c) All the substances derived from sulphuric acid by the replacement of the hydrogen by a metal are called what ?

(d) What is the gas used in making soda water ?

(e) What is the element which forms the basis of all the compounds of which living things are made ?

(f) What is the acid used in wireless accumulators ?

(g) Calcium chloride is used as what sort of agent ?

(h) What is the gas most commonly used in refrigeration plants ?

(i) From what metal is the "silver" paper used to wrap up chocolate made ?

(j) What is the most important metallic ingredient of our bones ?

- (k) What is the metal that is used for coating the back of mirrors ?
 (l) What is the metal that is used in making photographic films.
 (m) From what metal is fuse wire made ?
 (n) What symbol do chemists use for tungsten ?

(N. D. A. Exam. Dec. 1956)

Ans. (a) (i) Compound : water, sugar

(ii) Mixture : Air

(b) Hydrogen oxide H_2O i.e. water, Hydrogen peroxide H_2O_2 .

(c) Normal sulphates, e.g., Na_2SO_4 , $CaSO_4$. [They are different from acid sulphates in which only half of the hydrogen is replaced e.g. $NaHSO_4$].

(d) Carbon dioxide.

(e) Carbon.

(f) Dilute Sulphuric acid.

(g) As a drying agent, specially of gases.

(h) Ammonia.

(i) Tin.

(j) Calcuim.

(k) Silver.

(l) Silver.

(m) Alloy of tin and lead.

(n) W.

Q. 45. (A) What do you associate principally with each of the following names ?—

(a) Kepler

(b) Newton

(c) Darwin

(d) Einstein

(e) Freud

(B) Account briefly for the following phenomenon :—

(a) The rainbow

(b) While watching a cricket match we see the ball struck a moment before we hear the sound of the bat hitting the ball.

(c) A ship though made largely of steel, which is heavier than water, floats in water.

(d) In a vacuum a coin and a feather fall with equal speed.

(e) Water pipes are apt to burst in water.

(Assistant Grade Exam. Dec. 1955)

Ans. (A) (i) *Kepler*. The three fundamental laws of planetary motion (ii) *Newton*: The universal law of gravitation (iii) *Darwin*: Theory of Evolution as enunciated in his *Origin of Species* and *The Descent of Man* (iv) *Einstein*: Theory of Relativity (v) *Freud*: The foundation of psychoanalysis.

(B) (i) Rainbow is an arch formed in the sky showing the prismatic colours in their order. This is caused by the refraction of rays of light by the mirriods of rain globules in the air.

(ii) This is because light travels faster than sound, so that the ball is seen struck before we hear the sound of the bat hitting the ball.

(iii) This is because volume for volume, the steel ship, having so much hollow space within is lighter than the water it displaces and hence it floats.

(iv) The pull of gravity on the coin as well as the feather is the same and hence in a vacuum they fall with equal speed. It is only in the air that they do not fall at the same time because of the greater resistance offered to falling feather by the air.

(v) This is due to the expansion of water after 4°C when it begins to freeze. The force the expanding water exerts bursts the pipe.

Q. 46. Name (a) The farthest planet (b) The lightest element (c) The hardest stone (d) The heaviest liquid (e) The return of the rays of light from a polished surface (f) The change in the direction of a ray of light when it passes from a rarer to a denser medium (g) The relative weight of a substance as compared with an equal volume of water (h) The instrument which measures atmospheric pressure (i) The two branches of Biology (j) The science of weather and climate.

(Assistant Grade Exam. July 1955)

Ans. (a) Pluto (b) Hydrogen (c) Diamond (d) Mercury (e) Reflection (f) Refraction (g) Specific Gravity (h) Barometer (i) Botany and Zoology (j) Meteorology.

Q. 47. What is the function of each in a motor car ?

(a) Gear Box

(b) Battery

(c) Carburattor

(d) Dynamo

(e) Radiator

(Assistant Grade Exam. July 1955)

Ans. (a) The gear box converts a rotary motion about a given centre into a rotary motion about another centre and so helps

in the change of direction and lowering and increasing of speed of the motor car.

(b) The battery gives a constant supply of electric current to make the ignition mixture a running fuel, and thus to enable it to supply constant power for the running of the car. In the beginning it gives the spark to the ignition mixture to start it.

(c) The carburettor projects minute droplets of petrol into the air passing into the cylinders and thus is formed a suitable explosive mixture for ignition by the spark.

(d) The dynamo transforms the mechanical energy generated by the ignition mixture into electrical energy for the running of the car and keeps alive the battery.

(e) The radiator keeps the engine from getting too hot. It has a constant supply of a large amount of water round the engine and this water absorbs much of the heat generated.

Q. 48. Write short notes to explain the following phenomenon :—

(a) A bad egg floats in water.

(b) One's breath is visible in cold weather.

(c) Water boils at a lower temperature on the hills than on the plains.

(d) Polar bears are white.

(e) Farmers do not always grow the same crop in their fields.

Assistant Grade Exam. July 1955)

Ans. (a) On account of fermentation set in it, it becomes spongy and therefore lighter than the water it displaces and hence it floats.

(b) The water molecules in the breath inhaled out get condensed in cold weather and hence become visible as a sort of mist.

(c) This is on account of the rarefied atmosphere on tops of mountains which for this fact cannot retain much heat and hence water boils at a lower temperature with less heat content than in the plains.

(c) This saves them from being conspicuous to their enemies. The white skin mixes with the white colour of the snow and hence a white bear is quite inconspicuous from a distance.

(e) If they were to grow the same crop year after year the soil will get exhausted of some of its constituents which that particular crop would constantly draw ; hence there should be rotation of crop, so that the other crop may draw up some other mineral content and give the soil time to recoup. Thus, in England roots (e. g.,

turnips) are followed by barley, then grass and clover (which replenishes the soil with nitrogen), then wheat (which requires abundant of nitrogen), in successive years”.

Q. 49. (A) What do the following stand for ? :—

(a) Aeronautics (b) Biochemistry (c) Cosmology (d) Entomology (e) Genetics (f) Jurisprudence (g) Numismatics (h) Pathology (i) Phonetics (j) Refrigeration,

(B) For what are the following used : —

(a) Barometer (b) Dynamo (c) Horse-Power (d) Lactometer (e) Microphone (f) Microscope (g) Thermometer (h) Seismograph (i) Stethoscope (j) Turbine.

(Assistant Grade Exam. 1955)

Ans. A. (a) Aeronautics is the science which deals with design, testing, manufacture, maintenance and study of all forms of aircraft.

(b) Bio-chemistry is a sub-division of chemistry which deals with the chemical structure and metabolic processes of plants and animals.

(c) Cosmology is the science which deals with the evolution of the universe.

(d) Entomology is the branch of biology devoted to the scientific study of insects.

(e) Genetics is the scientific study of heredity and the laws governing similarities and differences in individuals related by descent.

(f) Jurisprudence is the science of law in the abstract, that is, not the study of any particular laws or legal system, but of the principles upon which all mature legal systems are founded.

(g) Numismatics is the study of coins, specially as throwing light on the history of the states or other authorities which issued them.

(h) Pathology is that branch of medicine which deals with the structural and functional changes caused by diseases.

(i) Phonetics is the science of speech sounds.

(j) Refrigeration is the act of drawing heat away from solids or liquids to lower their temperatures, generally for purposes of preservation.

B (a) Barometer for measuring atmospheric pressure, (b) Dynamo for converting mechanical into electrical energy (c) Horse Power for computing the power required to operate machinery or to state the power of an engine (d) Lactometer for testing purity or amount of butter fat in milk. (e) Microphone for the purpose of converting the impulses of sound into synchronous.

equivalent electrical impulses for the purpose of radio or telephone transmission (f) Microscope for producing enlarged visible or photographic images of extremely small objects (g) Thermometer for measuring temperature (h) Seismograph for recording earth tremors (i) Stethoscope for listening to the action of the heart and chest organs (j) Turbine is used in converting force of moving air, steam or water into mechanical energy capable of doing work.

Q. 50. A. Explain the importance of the following :—

(a) Arc lamp (b) Davy lamp (c) Ultra-violet rays (d) Finsen lamp (e) Light ship.

B. Bring out the difference between

(a) Steam engine and turbine (b) Innoculation and vaccination (c) product and by product (d) Automobile and automation (e) Glider and helicopter.

(Engineering Services Exam. Dec. 1955)

Ans. A (b) The arc lamp is used where a dazzling artificial light is required. It is specially used in the cinema projector. The light is obtained by an electric arc passing between two carbon rods. The arc is struck by bringing the two rods together and then rapidly separating them.

(b) Davy Lamp is of special use as the miner's safety lamp. Coal mines often become full of "fire damp" (i. e. marsh gas or methane). Any naked lamp will cause an explosion. The Davy safety lamp is based on the principle that a flame will not pass through a wire gauze. Since the invention of this safety lamp, causes of explosion by lamps in mines have been eliminated.

(c) The importance of ultra-violet rays lies in the fact that they are responsible for vitamin D manufactured in the human skin and in fruits.

(d) **Finsen lamp.** This is a powerful arc lamp, whose important use lies in the fact that it produces a maximum of violet and ultra-violet rays, so concentrated, converged and filtered as to have a powerful bactericidal effects, making possible deep penetration of red blood corpuscles.

(e) A lightship is a vessel moored at a point where it is not practical to build a light house. By installing a powerful automatic light arrangement in it, it serves the purpose of a light house.

B (a) In a steam turbine steam from a boiler at high pressure is directed by jets or by guided vanes against blades fixed to the outer surface of a drum. The energy of the escaping steam causes the drum and its blades to rotate and thus work is got from this rotating machine.

In the steam engine steam at high pressure blows from a boiler and instead of being directed against blades as in a steam turbine, it is allowed to flow in a cylinder containing a movable piston. The steam forces the piston back along the cylinder. When this piston has moved a short distance, the steam supply is cut off by an automatic device, but the expanding steam pushes the piston still further, when the steam is allowed to escape, and now the steam is allowed to enter the cylinder from the other end and forces the piston back to its original position. Thus the piston is made constantly to perform repeated motion of going from one end of the cylinder to the other and going back. In short in the steam turbine work is done by injection of steam on blades, while in the steam engine by injection of steam on a piston in a cylinder. In the first the motion is in a round direction, in the second it is in a straight line within a cylinder.

In inoculation it is the **disease germs that are introduced** in the human body by hypodermic injection, in order to give the subject mild attack of the disease, so as to prevent his being subsequently liable to a severe attack. In vaccination only a preparation of **dead bacteria of the variety responsible for a disease is injected** into the blood stream through the skin in order to increase his resistance to the disease.

(c) Product is the article of commerce produced in a manufacturing process. By-product is a sideways product produced in the process of manufacturing the main article.

Thus in the process of manufacture of the coal gas ammonium sulphate is a by product; so is basic slag, a phosphatic fertilizer, which is a by-product in the manufacture of steel.

(d) An automobile is a self propelled vehicle capable of travelling on a road or a field, e. g., a car, a bus etc. An automaton is a mechanical contrivance which when set in motion reproduces the motion of man or animals. "The remarkable automaton of the 18th century was a duck which dived, swam, ate, drank and by a chemical solution in its stomach digested food"

(e) A glider is an engineless aircraft similar to an airplane, It uses gravity and natural air currents to obtain forward motion.

The helicopter is a rotar aircraft which obtains lift and propulsion from engine driven rotors.

Q. 51. Write notes on the following :—

- (a) Immunity.
- (b) Cholera Vaccine.
- (c) B. C. G. Vaccine.
- (d) Blood bank.
- (e) Freeze dried plasma.
- (f) Give a short account of nuclear fission.

(Engineering Services Exam. Dec. 1954)

Ans. A. (a) Immunity is the resistance to infection by bacteria. Such resistance can either be inborn or of an acquired character. In the first case the immunity arises from the body's inherent ability to destroy invading organisms by action of certain white blood corpuscles. In the latter case the immunity is acquired either by having gone through the disease previously, when the blood of such persons contains antitoxins which neutralize the toxins, i.e., poisons of the disease in question or it is acquired either by inoculation or vaccination. Such infections cause the foreign substance introduced into the blood stream to produce a specific antibody. Injections used against small-pox, diphtheria etc., are based on this principle.

(b) Cholera Vaccine. This is an effective cholera prophylactic vaccine to counteract the action of and kill cholera germs and immunise a person from catching cholera.

(c) B.C.G. i.e. Bacillus Calmetta Guerin is a mild strain of tubercle bacille. The vaccine is prepared by the culture of a weakened strain of bovine for infection into the blood stream of patients suffering from or who are liable to be attacked by the tuberculosis disease. It is claimed that it has strengthened resistance to infection of this disease and cause of the disease has been reduced in many countries. In India it has been administered on a mass scale. But the effect has not yet been proved conclusively.

(d) BLOOD BANK means the place where blood is stored under refrigeration [from 4°C to 6°C] with a preservative containing citric acid, sodium citrate and dextrose. This serves for the purpose of transfusion of blood to patients who require it.

(e) Freeze dried plasma. The plasma is a thin yellow liquid, the fluid part of the blood. This plasma is processed and freed from fibrin that it may not coagulate and antitoxins are added for injection into animal and human beings to confer immunity to anthrax, tetanus, diphtheria, typhoid, allergies etc.

(f) Nuclear fission. Nuclear fission means the splitting up of the atom. This is based on the fact that fission of one of the uranium isotope U-235 may be secured by bombarding the nucleus of its atoms with neutrons. What happens is this, that when a neutron at high speed enters a nucleus of U-235, the latter undergoes fission into two roughly equal fragments which fly apart, while at the same time a small number of free neutrons are released and travel out through the material. These enter other nuclei, causing further fission, then more neutrons are released and soon an everlasting chain reaction of fission is set up which liberates millions of times the energy derived from burning the same quantity of coal.

Q. 52. What is ?—

- (a) Numismatics (b) Philately (c) Cartography (d) Ornithology
(e) Piscatology (f) Sericulture (g) Necromancy.
(Engineering Service Exam. 1953)

Ans. (a) Numismatics is the scientific study of coins and medals. (b) The study of postage stamps. (c) Map drawing. (d) The science of birds—their origin, classification, structure and habitate. (e) The science dealing with fishes. (f) Sericulture is silk worm breeding and the production of raw silk. (g) Necromancy is the attempt to obtain knowledge of future events by conjuring up the spirits of the dead.

Q. 53. (a) Why does oil thrown on a rough sea make it calmer ?

(b) What is the difference between neon and fluorescent lighting ?

(c) Why is a parachute always provided with a hole in the centre ?
(Engineering Service Exam. 1953)

Ans. (a) Because oil spreads out on the surface of the sea and forms a sort of a covering lather and thus serves to becalm the sea.

(b) Neon lighting is produced by subjecting the inert neon gas at a low pressure to an electric discharge. It has a rich orange glow. The glass tubes having electrodes in which it may be made to glow are usually of iron. In fluorescent lighting the inside of a glass tube is coated with a mixture of fluorescing salts (i.e. salts which can glow) which are made to glow by means of an ultra-violet light (which in itself is invisible) produced inside the tube by means of mercury vaporised and excited by electricity.

In the former case it is the neon gas that glows, in the latter it is fluorescing salts that glow by help of ultra-violet light.

(c) To make the air to pass through, and help the parachute to descend slowly, otherwise it may not come down easily and remain floating in the air.

Q. 54. Fill up the blanks in the following by one word :

- (a) Water boils at two hundred and twelve degrees.
(b) The first letters of the seven colours of the rainbow are contained in the following words :—
(c) To correct for short sight we require a — — lens.
(d) The invisible portion of solar radiation which effects a photographic plate and is of shorter wave length than the violet portion is called — — radiation.
(e) When one — — of current flows through a resistance of one ohm, the potential difference across the resistance is one — —.

(f) 32 feet/sec./sec. is the—due to—.

(g) A kilowatt hour is the—unit of electrical energy.

(h) When a solid melts, the heat consumed without causing rise of temperature is called—heat of—.

(i) A molecule is the—particle of matter capable of independent existence.

(j) Copper is a good—of electricity but rubber is a—
(National Defence Academy Exam. Jan. 1956)

Ans. (a) Water boils at two hundred and twelve degrees Fahrenheit.

(b) The first letters of the seven colours of the rainbow are contained in the following word : *Vibgyor*.

(c) To correct for short sight we require a *concave* lens.

(d) The invisible portion of solar radiation which effects a photographic plate and is of shorter wave length than the violet portion is called *ultra-violet* radiation.

(e) When one *ampere* of current flows through a resistance of one ohm, the potential difference across the resistance is one *volt*.

(f) 32 feet/sec./sec. is the *acceleration* due to *gravity*.

(g) A kilowatt hour is the *Board of Trade* practical unit of electrical energy.

(h) When a solid melts, the heat consumed without causing rise of temperature is called the *latent heat of fusion*.

(i) A molecule is the *smallest* particle of matter capable of independent existence.

(j) Copper is a *good* conductor of electricity but rubber is a *bad* conductor of electricity.

Q. 55. Write down the names of the following :—

(a) The most famous scientist who died in 1955.

(b) The first person who made radio communication a practical proposition.

(c) The President of the 'Atom for Peace' Conference held in 1955.

(d) The discoverer of the internal combustion engine.

(e) The discoverer of radium.

(f) The person who first demonstrated that mechanical energy can be converted into heat.

(g) The person who discovered the electron.

(h) The eminent Indian scientist who died just before the 1955 session of the Indian Science Congress.

(i) The discoverer of the "rarer gases".

(National Defence Academy Exam. Jan. 1956)

Ans. (a) Einstein (b) Marconi (c) Mr. Bhaba (d) Etienne Lenoir and N. A. Otto (e) Marie and Pierre Curie (f) Count Rumford (g) Sir J. J. Thomson (h) Sir Shanti Swarup Bhatnagar (i) Sir William Ramsay.

Q. 56. Fill up the blanks in the following :—

- (a) When carbon is burnt in an atmosphere of oxygen we get ———.
- (b) Iron sheets can be prevented from rusting by ——— them.
- (c) Some chemical reactions can be accelerated by the use of suitable ———.
- (d) Phosphorus is a highly ——— substance.
- (e) The ——— formed by the combination of three atoms of hydrogen and one atom of nitrogen is called ———.
- (f) The ——— formed by the combination of two atoms of hydrogen, one atom of sulphur and four atoms of oxygen is called ———.
- (g) If I eat potassium cyanide I will ———.
- (h) By the electrolysis of water, we get the following gases :—
- (i) A metal which exists in a liquid form at ordinary room temperature is ———.
- (j) ——— wire when burnt gives out copious white light.

(National Defence Academy Exam. Jan. 1956)

Ans. (a) Carbon dioxide (b) Galvanizing (c) Catalysts (d) Inflammable and poisonous (e) Compound, Ammonia (f) Compound, Sulphuric acid (g) die (h) Hydrogen and oxygen (i) Mercury (j) Magnesium.

Q. 57. Describe each of the following :—

- (a) Structure of the atom.
- (b) Generation of electricity by water power.
- (c) Working of a mercury column of barometer.

(National Defence Academy Exam. Jan. 1956)

Ans. (a) According to the modern theory developed by scientists, among whom Lord Rutherford is the foremost, the atom is a relatively open structure, with a form comparable to that of the solar system having a central nucleus which is 10,000th as big across as the atom and this nucleus has planetary bodies (called the electrons) revolving about it, as the planets do about the sun.

Each nucleus is composed of two kinds of particles, the protons and the neutrons. Each proton has a positive electric

charge, equal in magnitude but opposite in sign to that of the electron. The neutrons have no charge.

Proton and neutron have nearly equal mass and this is about 1846 times as great as the mass of the electron. Since the proton and electron charges are equal and opposite (protons having the positive charge, electrons the negative), the atom as a whole has no charge. The number of protons within the nucleus of any atom is equal to the number of electrons outside the nucleus.

(b) For the generation of electric power from water it is necessary that a high level in the path of a river, a big dam or an artificial lake be constructed so that a regular flow of water is obtained from it. This pent up water at high potential is then directed down through pipes on the blades of a water-wheel, commonly called a water turbine which is situated at a very low level from the lake from which the water issues. The water turbine or turbines are of course fitted in a building called the power house.

The water coming down from a high level has a very high kinetic energy and falls as a very powerful jet of water on overlapping buckets and this causes the whole structure to spin with a tremendous speed on its bearings. Thousands of horsepower is thus generated, depending upon the amount and force of water coursing down the pipes. This mechanical energy is converted into electric current by the revolution of a rotor in a surrounding field of fixed windings, termed the stator.

As water power nearly always exists some distance from the centres of population where the current is needed, long transmission lines carry the current on the grid pylons, and the current is distributed as required.

(c) The working of the mercury column type of barometer depends upon the atmospheric pressure exerted on the surface of the mercury on which the mercury column stands and on the variations of the pressure. This barometer can be used for two main purposes : 1. For determining the height of a place. 2. Forecasting weather. Standard pressure at sea level holds mercury in a tube to a height of 29.92 inches or 76 centimeters. As air pressure diminishes with altitude, it has been observed that barometer reading drops roughly one inch per 1000 ft. until at $3\frac{1}{2}$ miles above sea surface air pressure is about one half that at sea level. At 10 miles above the earth the pressure is 10% of that at sea level and it diminishes ultimately to zero.

As we have said above, variations in this pressure are also used to forecast the weather. A constant barometer means constant weather. For rough, wet and gusty high winds it is low. For quiet weather it is high, whether it be hot or cold. Quick changes in the barometric pressure indicate quick changes in

weather. A rapid fall means very wild weather in the immediate future.

If it is going to rain, the air will get damp due to its containing water vapour and therefore less dense than dry air, so the lowering of the mercury will indicate that rain is coming. If it is the reverse, that is, it is going to be bright weather, the mercury column will rise up owing to the air being dry and comparatively denser.

Q. 58. Fill up the blanks in the following :—

- (a) Cataract is a disease or complaint of the.....
- (b) Pneumonia is caused by inflammation of the.....
- (c) Jaundice is a disease of the.....
- (d) The.....of a person suffering from malaria is enlarged.
- (e)gives us immunity from small pox for a short period.
- (f) Typhoid germs are carried mainly through.....and.....
- (g) Septicaemia is a disease of the.....
- (h) We can find out whether a person is suffering from diabetes by testing his or her.
- (i) Rheumatism is a disease marked by pain and stiffness in the.....of the human body.
- (j) Saliva is an.....liquid secreted by certain glands in the..... (National Defence Academy Exam. Jan. 1956)
- (a) Eye (b) Lungs (c) Liver (d) Spleen (e) Vaccination
- (f) Infected food, infected water and house fly (g) Blood (h) Urine
- (i) Joints and muscles (j) Alkaline digestive, mouth cavity.

Q. 59. (a) Mention the part or organ of the human body that is affected when a person is suffering from the diseases or ailments mentioned below :—

Disease or ailment	Part or organ of the body
(i) Thrombosis	
(ii) Typhoid	
(iii) Tuberculosis	
(iv) Arthrites	
(v) Paralysis.	

(b) The following list contains a number of items useful to man. Some are obtained from the animal kingdom, some from plants and trees and some from minerals. Classify them according to their sources—

Wool, Cheese, Quinine, Rubber, Euclyptus oil, Gum, Pearls, Mica, Marble, Asafoetida.

Mineral sources

Animal sources

Plant sources

(National Defence Academy Exam. June 1956)

Ans. (A) Disease or ailment	Part or organ of the body
(a) <i>Thrombosis</i>	Blood vessel (vein or artery)
(b) <i>Typhoid</i>	Intestine
(c) <i>Tuberculosis</i>	Lungs
(d) <i>Arthrites</i>	Joints
(e) <i>Paralysis</i>	A part of the brain or spinal cord and muscles either of one side of the body including only one arm and leg or both sides.

(B) Substance	Source
Wool	Animal
Cheese	Animal
Quinine	Plant
Rubber	Plant
Euclyptus oil	Plant
Gum	Plant
Pearls	Animal (It is a secretion of certain mollusks)
Mica	Mineral
Marble	Mineral
Asafoetida	Plant

Q. 60. Give the name of instrument or apparatus used for each of the following purposes :—

Purposes	Instrument or apparatus
(a) Measuring speed.	
(b) Testing milk.	
(c) Continuous recording of atmospheric pressure.	
(d) For ascertaining the height above ground in an aeroplane.	
(e) Recording the behaviour of the heart.	
(f) Recording earth tremours.	
(g) For knowing approximately the North-South direction of a place.	
(h) For seeing a minute object invisible to the naked eye.	

(National Defence Academy Exam. June 1956)

Ans. (a) Speedometer (b) Lactometer (c) Aneroid barometer
(d) Altimeter (e) Cardiograph (f) Seismograph (g) Compass
(h) Microscope (i)

Q. 61. (a) What is a balanced diet ?

(b) What is the difference in time between Greenwich and a place located 120° West longitude ?

(c) Which of the following substances in solution will turn blue litmus red ?—

Carbon dioxide, lime, lime juice, sulphur dioxide, soda, vinegar, oil of vitrol, common salt.

(d) What is soil erosion ?

(e) Against each of the following, write the approximate word which is connected with it, choosing the word from the list in brackets :—

Calyx

Asbestos

Bumblebee

Ulna

(Mineral, leaf, flower, insect, bone, disinfectant, bird, medicine).

(f) Name any three ductless glands. Is liver a ductless gland?

(g) Why does the outer surface of a glass containing ice water become wet ?

(h) What is the function of the respiratory system in the human body ?

(i) What is a sidereal day ?

(j) What is a Nebula ?

(k) What is an Artery ?

(Indian Navy Exam. July 1956)

Ans. (a) A diet which contains in proper proportions carbohydrates, proteins, sugars, fats, minerals, essential vitamins to keep the body fit for the type of work it has to do is a balanced diet. Thus an average adult working moderately requires daily at least one pound of carbohydrates, four ounces of fat, four ounces of proteins, small amounts of minerals and sugars, essential vitamins and at least six glasses of water. He has then a balanced diet.

(b) For every 15° degrees of longitude there is a difference of 1 hour, therefore for a place 120° longitude from Greenwich the difference in time will be 8 hours. As it is in the west of Greenwich the time at the place will be 8 hours less than Greenwich time.

(c) Carbon dioxide, sulphur dioxide, lime, lime juice, vinegar, oil of vitriol.

(d) **Erosion of soil** is the wearing away of rock waste and soil by wind, waves, running water or glaciers. Thus sea coasts are worn back by waves and they carry away the rock waste. A glacier erodes by grinding boulders against its bed. In arid regions wind is an important erosive agent, transporting sand dunes.

(e) Calyx	Flower
Asbestos	Mineral
Bumblebee	Insect
Ulna	Bone.

(f) The thyroid, spleen, pituitary. The liver is not a ductless gland. It has ducts.

(g) Because ice makes the outer surface of the glass cold. To this cold the moisture in the air condenses on the glass and it gets wet.

(h) The function of the respiratory system in the human body is to carry on the function of breathing in which oxygen which is essential to life is taken into the lungs by inspiration and carbonic acid, a waste product of the body is expelled by expiration.

(i) **Sidereal Day** is the period elapsing between two successive transits of a meridian by a star. It is approximately 23 hrs. 56 minutes.

(j) Nebula is the term used for a cloud like mass of gaseous matter of stars far beyond the solar system. Large telescopes disclose them to be an enormous aggregation of stars, which are also referred to as spiral galaxies or inland universes. These nebula are probably enormous stellar atmospheres of a relatively attenuated type.

(k) An artery is a blood vessel which carries blood coming from the heart to different parts of the body.

Q. 62. What do you understand by the following ? :—

(a) **Astigmatism** (b) **Fumigation** (c) **Parasite** (d) **Toxin** (e) **Gullet** (f) **Catalyst** (g) **Carburettor** (h) **Chromosomes** (i) **Dynamo** (j) **Lymph** (k) **Embryo** (l) **Anticyclone** (m) **Infra-red-rays** (n) **Proteins**.

(Indian Navy Exam. July 1956)

Ans. (a) Astigmatism is a defect of the curvature of the refractive surfaces of the eye (cornea and the lens) resulting in uneven bending of light rays in the eyes. There may be clear vision of vertical objects but not of horizontal at the same distance. It may be rectified by the use of cylindrical lenses.

(b) **Fumigation** is the term applied to introducing in a closed room or place a strong germicide so as to kill all the germs in that room or place. Sulphurous acid produced by burning sulphur is

most commonly used for freeing rooms from vermins. The room is first stripped, then windows, chimneys etc. are stopped up and the sulphur is left burning, the door being tightly sealed, so that no fumes escape. This is done at least for 24 hours. This will kill all the germs and vermins etc. in the room. Sometime chlorine is used in place of the sulphurous acid.

(c) **Parasite.** An organism which obtains its nutrition in or on the living body of a plant or animal or man is a parasite.

Examples : Liverfluke of sheep, the malarial parasite in man, the mistletoe on plants. Many disease producing bacteria are parasites.

(d) **Toxin** is poison produced by certain organisms, specially bacteria. Thus diphtheria is a toxin—caused disease.

(e) **Gullet**, also called oesophagus or throat is the tube lined with mucous membrane which in man is a tube about 9 inches in length and extends from the lower part of the pharynx and passing along the front of the spine terminates in the abdomen.

(f) **Catalyst** is a substance which causes or accelerates a chemical reaction. It either takes no part or remains unchanged at the end of the chemical reaction. Examples of catalysts are platinum, plutonium oxide, iron, nickel, zinc, etc.

(g) **A Carburettor** is an accessory to internal combustion engines whose function is to regulate the flow of fuel to the cylinders of the engine and to mix the petrol vapours with the air in right proportions so as to produce a suitable explosive mixture for ignition by the spark.

(h) **Chromosomes** are threadlike (or spindlelike) bodies—the form assumed by chromatin materials of cell nucleus, during the process of normal cell division. The chromosomes are supposed to be the carriers of hereditary factors.

(i) **A Dynamo** is a machine that converts mechanical into electrical energy, consisting of two major parts, the revolving armature (called the rotor) and the stationary field magnets (called the stators).

(j) **Lymph** is the thin colourless fluid diffusing from blood in the capillaries surrounding the tissues. Lymph carries white blood corpuscles from the blood (called the leucocytes) and lymphocytes from the lymph glands, and supplies the cells with nutrition, and moves away waste.

(k) **Embryo** is the scientific term used for the young of an animal while it is yet in the initial stages of development in the womb. This term is equally applied to the plant in its rudimentary stage within the seed.

(l) **Anticyclone** is the outward flow of air in a spiral movement

from the centre of an atmospheric area of high pressure. In the northern hemisphere it is counter-clockwise.

(m) **Infra-red-rays.** These are invisible heat rays of the solar spectrum, which have a longer wavelength than the longest visible rays of the spectrum, i.e., the red rays.

(n) **Proteins** are extremely complex organic substances which make up a large part of the protoplasm of living matter. They are made up mostly of the elements : carbon, oxygen, hydrogen, nitrogen along with small proportion of sulphur, iron, potassium etc. Lean meat, fish, cheese and eggs are the richest sources of proteins. Some of the best known of the proteins are albumin (in egg white), casein (in cheese), fibrinogen (in blood), glutenin (in wheat) etc.

Q. 63. (a) With what are the following names associated : ?

(i) Archimedes (ii) Lister (iii) Ramsay (iv) Galileo (v) Mendel (vi) Becquerel.

(b) Why does not the jet plane need a propeller ?

(c) What will happen if a lump of quick lime is dropped into a pot of water ?

(d) How does the skin regulate the temperature of the body ?

(e) What do you understand by :—

(i) Photosynthesis (ii) Inoculation (iii) Air conditioning.

(iv) Horse Power (Indian Air Force Exam. August 1956)

Ans (a) (i) Archimedes is mainly associated with the Archimedian principle, that an immersed body displaces its own weight of fluid (ii) Lister with antiseptic surgery (iii) Ramsay with the discovery of helium and other rare gases in the atmosphere (iv) Galileo with the discovery of the laws of falling bodies, that all bodies small or big, of whatever mass or texture fall at the same time from a given height with a speed of 32 ft. per sec. in a vacuum (v) Mendel with what are called the Mendelian laws of heredity (vi) Becquerel with the discovery in 1896 of the Becquerel rays, the first indications of radio-active rays.

(b) This is because in a jet plane the forward "thrust" results from rearward expulsion of mass of gas under high pressure generated by combustion in jet engine. There is thus no need of a propeller.

[It should be noted that jet propulsion apparatus is essentially a reaction motor based on Newton's third law that every action has an equal and contrary reaction.]

(c) If a lump of quick lime is dropped into a pot of water, the lump will break up to form a white powder, called "slaked" lime

with evolution of considerable heat. The slaked line so formed is Calcium Hydroxide ($\text{Ca}(\text{OH})_2$).

(d) It has automatic arrangement in it and acts as a thermostat.

(e) (i) **Photosynthesis** is the building up of carbohydrates from carbon dioxide of the air by leaves of plants in the presence of sunshine. The chlorophyll in the green leaves is the active agent in the process.

(ii) **Inoculation** is the introduction of viruses or disease germs into the body of a human being or an animal by hypodermic injection so as to give a mild attack of the disease and thus immunise it from a severe attack of the disease later on. The attack of small pox is thus prevented in this way.

(iii) **Air conditioning** is the treatment of air to regulate temperature, purity, moisture content, circulation etc. A typical apparatus which does this contains refrigerating, heating, water adding and absorbing systems in it. It has also filtering screens, impeller fans and all these are combined into one whole system with a control for each function.

(iv) Horsepower is the unit of power used in computing the power required to operate machinery or to state the power of an engine. An engine which is developing 33,000 foot-pounds of energy per minute is said to be working at 1 horse-power. Stated in other words a horse-power is equal to a rate of 33,000 ft.-lbs. per minute.

[If 33,000 lbs is lifted one ft. in a minute, one horse power of energy has been used.]

Q. 64. (a) Both barometer and thermometer consist of glass tubes and mercury. In what respects do they differ and what is each used for ?

(b) What is acceleration ?

(c) What are the following scientists famous for—(i) Cure (Madam) (ii) Einstein (iii) Kelvin (iv) Marconi (v) Oppenheimer (vi) Roentgen (vii) Wilson.

(d) What is sublimation ? Give two examples of substances which sublime

(e) You are given three glass jars, one containing air, one containing nitrogen, and one containing oxygen. What experiment would you carry out to distinguish them ?

(f) Distinguish between a base and an alkali.

(g) How is coal formed in nature ? Give three types of coal.

- (h) What are the following used for (i) Anemometer
(ii) Photometer (iii) Voltmeter:

(i) Mention the uses of the following :—

- (i) Calcium chloride
- (ii) Liebig's condenser
- (iv) Kipps' apparatus
- (v) Methyl Alcohol
- (vi) Thermostat
- (vii) Centrifuge.

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(Military College Exam. June 1956)

Ans. (a) The mercury barometer consists of a tube about 36 inches long, closed at one end, and filled with mercury and inverted with the open end dipping into a vessel of mercury. It is used for measuring the pressure of the atmosphere.

The thermometer consists only of a thin glass capillary tube with one side having a bulb. The tube and the bulb are filled with mercury. As the tube stands erect, the bulb is at its uppermost end.

The thermometer is used for the measurement of temperature.

(b) Acceleration is the rate of increase in the velocity of a moving body.

(c) (i) Madam Curie is famous for the discovery of the radio-active element radium (ii) Einstein for his special Theory of Relativity (iii) Kelvin is best known for his work in connection with electrical service, e.g., invention of the modern compass, tide gauge and tide predictor, the electricity meter and the absolute scale of temperature (iv) Marconi for practical wireless telegraphy (v) Oppenheimer for notable work in nuclear physics, relativity theory, quantum theory and cosmic rays (vi) Roentgen for the discovery of the X-rays (vii) Wilson for the Wilson cloud chamber.

(d) The direct transition of a substance from the vapour to the solid state is known as sublimation. Thus when iodine is heated it vaporises and if it is cooled, it solidifies again without going through the liquid stage.

(e) If we introduce a burning stick into each of the jars, we will find that if it contains air, it will remain burning without any apparent change; if it contains oxygen, there will be a very brilliant glow of the flame; if it is nitrogen, the flame will go out as nitrogen does not support combustion.

(f) A base is a chemical substance which neutralises acids to give a salt and water. This class includes the hydroxides and normal oxides of metals as well as ammonium hydroxides etc.

Alkalies are these bases which are soluble in water and turn red litmus blue.

(g) Scientists affirm that about three hundred million years ago vast forests flourished in a damp and uniformly warm climate. These forests were composed chiefly of plants resembling our present day horsetails and club mosses but very much larger than present day representatives. Coal is the final product of the decay and fossilisation of this luxuriant vegetation.

Three varieties of coal are : Peat, Lignite, Anthracite.

(h) (i) Anemometer is a device for measuring the speed of a gas or wind.

(iii) Photometer is an instrument for comparing unknown intensity of light with known intensity.

(iv) Voltmeter is an instrument for measuring differences of voltage or electrical potential.

(v) Calcium chloride is used for drying gases, except ammonia with which it combines).

(vi) Liebig's condenser. This is an apparatus used to convert a vapour into the liquid state by cooling with the aid of water. This apparatus consists of a glass tube enclosed in a jacket through which a constant stream of cold water is passed. The liquid to be distilled is contained in a distilling flask provided with a side tube which is passed through a cork in the condenser. In the neck of the flask a thermometer is supported by a cork so as to enable the boiling point of the liquid to be determined.

(vii) "Kipps" Apparatus is an arrangement for generating gases such as carbon dioxide or hydrogen sulphide, the essential feature being that when the delivery tap is turned off, the chemicals from which the gas is produced are automatically separated from one another by the rising pressure of the gas within the apparatus.

(viii) Methyl Alcohol is used in the preparation of organic dyes and varnishes and for the preparation of methylated spirits and perfumes.

(ix) Thermostat is an instrument for the automatic regulation of temperature.

(x) Centrifuge. This device uses centrifugal force to separate substances of different densities, *e. g.*, liquid and solid portion of blood. Cream separation is common type.

Q. 65. Answer the following :—

(i) What are the causes of typhoid fever? What are the preventive measures to be taken?

(ii) Describe the bladder and its chief functions.

- (iii) What are the chief sources of Vitamin B and Vitamin C ?
What diseases are caused by their deficiency ?
- (iv) What is pasteurized milk ?
- (v) Name the four kinds of teeth in the human system.
- (vi) Name the four chief parts through which the air we breathe in through the nose passes on its way to the lungs.

(Military College Exam. June 1956)

(i) Typhoid fever is caused by the typhoid bacillus introduced into a person's system with contaminated food and drinking water. The contamination of food and water may have been brought about by flies sitting on the stools of a patient suffering from the disease.

Preventive measures include : Innoculation given in three doses about a week apart. This produces immunity for two years. Other preventive measures are based on public health measures to keep the water and milk supply safe, safe sewage disposal, clean food, treatment and supervision of carriers, elimination of flies, covering a patients' stools and sputum with earth and letting this be washed away by a gutter with water that swiftly carries it away.

(ii) The bladder is a muscular walled bag below the kidneys which stores urine. Two tubes, one from the right, and the other from the left kidney enter the bladder and these conduct urine drop by drop from the kidneys for storage purpose till the bladder is full and the nervous system that controls the muscles of the bladder causes it to discharge the urine. The storage of the urine is made possible by the fact that the lower opening of the bladder is controlled by a sphincter muscle which when contracted keeps the bag closed.

As soon as the discharge of the urine takes place the bag collapses and the urine begins to collect in it again.

(iii) Vitamin B is contained in the germ and husks of peas, beans, cereals and nuts ; in vegetables, fruits, egg-yolk-milk, and meat and particularly in Marmite. Its absence causes beri-beri, a disease marked by dropsy and inflammation of nerve endings or pellagra.

Vitamin C is found in lemons, oranges, tomatoes and other fruit and vegetable. Its absence causes scurvy.

(iv) Pasteurized milk is milk which has been heated to 145° F. for 30 minutes, then cooled rapidly and then kept in a hermetically sealed can to keep it free from bacteria.

(v) The four kinds of teeth in the human system are :—

- (1) The two teeth near the centre called the incisors or cutting teeth.

- (2) The canine or eye tooth.
- (3) The bicusps or premolars.
- (4) The molars or the grinding teeth.

(vi) (1) The air enters the body through the nose which is the organ for air entry (2) The nose opens into a large narrow irregular chamber lined with warm moist membrane; consequently the air passing through it is warmed and moistened (3) It then passes down a wide tube called the trachea or wind pipe (4) This tube divides into two bronchi leading to each lung.

Q. 66. What do you understand by the following ? :—

(a) (i) Alimentary tract (ii) Pituitary gland (iii) Medulla oblongata (iv) Coronary thrombosis. (v) Polio (vi) Water-borne diseases (vii) Carrier (viii) B. C. G.

(a) Mention one important contribution of each of the following :—

(i) Faraday (ii) Darwin (iii) Röntgen (iv) Einstein (v) Pasteur (vi) Pavlov (vii) Newton (viii) Galileo (ix) Ernest Lawrence.

(c) Who discovered the following :—

(i) Helium (ii) Laughing gas (iii) Phosphorus (iv) The law of gravitation (v) Penicillin.

(d) Mention the commercial use of :—

(i) Argon (ii) Chromium (iii) Manganese (iv) Helium (v) Chlorine.

(e) What are the following ? :—

(i) Seismograph (ii) Geiger Counter (iii) Antibiotics (iv) Periscope (v) Fossil.

(Special Class Railway Apprentice Exam. June 1956)

Ans. (a) The alimentary tract is the tubular passages, five or six times the length of the body (about 30 ft long in man) lined throughout with mucous membrane, and containing digestive glands which function in digestion and absorption of food. It extends from the mouth to the anus and includes the mouth, pharynx, oesophagus, stomach, the small and large intestines and last of all the rectum,

(ii) Pituitary gland. The pituitary is a ductless gland at the base of the brain secreting a number of hormones (nearly twelve) which perform a number of functions. The secretions promote growth, control fat distribution and utilization, protein metabolism, the amount of blood sugar and the growth of the thyroid, parathyroid, adrenal, cortex. In male they develop the male sex characteristics, the milk production in female and so on.

(iii) **Medulla Oblongata** is a small knob like body in the uppermost end of the spinal chord or it is the hindmost segment of the brain. It controls involuntary and automatic action, i. e., actions which are not performed deliberately. Thus it deals with the lungs, the heart, the digestive system, control of blood sugar etc.

(iv) **Coronary thrombosis.** This is the formation of blood clot in a coronary artery supplying blood to the heart. If circulation is blocked instant death may occur.

(v) **Polio or infantile paralysis** is an infectious virus disease with crippling and paralysing results often leading to death. The virus attacks nerves and nerve centres often with incurable effect on the muscles. The symptom of the disease are stiffness of the neck, paralysis and slight fever.

(vi) **Water-borne diseases.** Diseases which are caused by polluted or contaminated water like cholera, typhoid, dysentery, etc.

(vii) **Carrier.** The term is applied to a person, "who recovered from an infectious disease retains the germ for various period of time and is capable of spreading the infection, specially typhoid, paratyphoid, dysentery, cholera, diptheria, scarlet fever, meningitis. The germs are carried in the urine, faeces, throat, tonsils and nose."

The term is also applied to animals or insects, that without catching the disease themselves, convey the germs of the disease to others.

(viii) **B. C. G.** is a vaccine (*Bacillus-Calmette Guerin*) prepared from a weakened strain of bovine tubercle bacillus. It is being extensively administered to persons who have never been infected by the tuberculosis bacillus, but are exposed to the disease.

(b) (i) **Faraday** discovered electromagnetic induction basic to the dynamo.

(ii) **Darwin.** The formulation of the concept of organic evolution, known as Darwinism set forth in his *Origin of the Species*.

(iii) **Roentgen.** The X-rays, known also as the Roentgen rays.

(iv) **Einstein.** The special theory of Relativity.

(v) **Pasteur.** laid the foundation for work in antiseptic surgery

(vi) **Pavlov.** Pioneer work on conditioned reflexes.

(vii) **Newton.** The fundamental laws of universal gravitation.

(viii) **Galileo.** Discovery of the laws of falling bodies.

(ix) **Ernest Lawrence** built the first cyclotron for production of very high energy (millions of electron volts) particles with which he accomplished transmutation of chemical elements and artificial radio activity.

(c) (i) Helium—by Sir William Ramsay (ii) Laughing gas—by Sri Humphrey Davy (iii) Phosphorus—by Brand (in 1669) (iv) The law of gravitation—by Newton (v) Penicillin by Sir Alexander Fleming.

(d) (i) Argon is used in gas filled electric lamps (ii) Chromium plating (iii) Helium to fill dirigibles on account of its lightness and non-inflammability (iv) Chlorine as a good bleaching agent.

(e) (i) Seismograph is a delicate instrument by which the distance and intensity of the slightest earth tremors can be ascertained (ii) Geiger counter is a very sensitive instrument used to detect radioactivity (iii) Antibiotics are chemical substances given off by micro-organisms (molds and bacteria) which fight diseases caused by certain bacteria and viruses. Penicillin, aureomycin, terramycin, chloromycetin are all antibiotics. (iii) Periscope is an optical instrument for seeing over or around oblique objects or objects out of line of vision, used in submarines and military tanks. (iv) Fossil is the form or remains of ancient living things preserved in rock, coal, earth or gum.

Q. 67. (a) (i) Which is the longest telescope in the world ?

(ii) What is the Boyle's Law.

(iii) Give an example of 'centrifugal force' from every-day experience.

(iv) State the Law of Dulong and Petit.

(v) How can you detect the presence of an element in a distant star ?

(b) Explain the following terms :—

(i) Catalyst (ii) Electrolysis (iii) Photosynthesis (iv) Enzymes (v) Exothermic reaction.

(Special Class Railway Apprentice Exam. June 1956)

(a) (i) The 200' Mt. Palomar telescope U. S. A.

(ii) Boyle's Law states that in a gas at constant temperature the volume is inversely proportional to the pressure.

(iii) Example of centrifugal force : If a stone bound at the end of a string is twirled round, the force that makes it fly away is the centrifugal force. It is only held by the centripetal force acting inward along the string.

The tips of a propeller would fly off if the construction were not very strong.

(iv) Dulong and Petit's law states that specific heats of elements are inversely proportional to their atomic weights and that specific heat is constant for all solid elements.

(v) To ascertain the chemical contents of a star we use the spectroscope. This instrument enables us to analyse the light emitted by objects near us, and even millions and billions of miles far off as are the stars. It consists of two hollow tubes mounted horizontally on a disc supported by vertical shafts. Between the ends of these tubes is a prism for dispersing light rays and thus showing their spectra. One of these tubes pointing towards the distant object, say a star, has a slit through which light enters from the star and a lens at the inner end. Now light as it enters through the slit in the tube is transformed into parallel rays and as strikes the prism they are dispersed into a spectrum. The second tube contains a magnifying lens, which enables the observer to observe a magnified image of the spectrum. It has been observed that the spectrum from the stars usually consists of a continuous band of colours which is similar to that of the solar spectrum and there are in between a number of dark lines (called Fraunhofer lines). By noting the position of these dark lines and comparing them with the corresponding bright lines that the spectra of elements on our earth similarly show through the spectroscope, we know the elements contained in a certain star.

- (b) (i) A *catalyst* is a substance which quickens a chemical reaction but it itself takes no part in the action or remains uncharged at its end. Good catalysts include platinum, platinum oxide, iron, nickel, zinc etc.
- (ii) **Electrolysis** is the decomposition of conductive solutions or molten substances by the passage of direct current of electricity through them. Electrophating is an application of electrolysis.
- (iii) **Photosynthesis** is the process by which the chlorophyll of green leaves of plants uses, in the presence of sunlight, the carbon dioxide of the air and water from the soil to manufacture sugar. The sugar is further synthesised to starch and other organic compounds while oxygen is liberated as an end product.
- (iv) Enzymes are organic catalysts secreted by animal or plant cells in small quantities, which can bring about chemical changes in the substances on which they act. Examples : *Diastase* which converts starch into sugar ; *invertase* found in yeast which converts cane-sugar into glucose.
- (v) **Exothermic Reaction.** Reactions in which heat is evolved are called exothermic reactions.

Q. 68. (a) Name the instrument or apparatus used for each of the following purposes :—

- (i) Observing distant objects.
- (ii) Observing minute objects.
- (iii) Measuring atmospheric pressure.
- (iv) Finding direction at sea.
- (v) Detecting the approach of an aeroplane.
- (vi) Listening to the action of the heart and lungs.
- (vii) Observing the interior of an opaque body.
- (viii) Maintaining air at an even temperature.
- (ix) Maintaining a low temperature
- (x) Keeping liquids hot or cold.

(b) Name the sciences dealing with each of the following subjects :—

(i) Heavenly bodies (ii) Plant life (iii) Animal life (iv) The human body (v) The structure of the human body (vi) Mental life (viii) Language.

(c) Write the answer to each of the following in one line,

- (i) Why do our hands become warm if we rub them together?
- (ii) Why does a lighted candle go out if it is covered with a glass jar?
- (iii) Why do we not hear an electric bell ringing in a vacuum?
- (iv) Why is an iron rim heated before it is fitted to a wheel?

Ans. (a) (i) Observing distant objects : Telescope.

(ii) Observing minute objects : **Microscope.**

(iii) Measuring atmospheric pressure : **Barometer.**

(iv) Finding direction at sea : **Mariner's Compass.**

(v) Detecting the approach of an aeroplane : **Radar.**

(vi) Listening to the action of the heart and lungs :

Stethoscope

(vii) Observing the interior of an opaque body :

X-ray apparatus.

(viii) Maintaining a low temperature : **Refrigerator**

(ix) Keeping liquid hot and cold : **Thermos flask.**

(b) (i) Heavenly bodies : Astronomy.

(ii) Plant life : **Botany.**

(iii) Animal life : **Zoology**.

(iv) The human body : **Human physiology**.

(v) The structure of the human body

Human Anatomy

(vi) Mental life : **Psychology**

(vii) Language : **Philology**.

(c) (i) Because of friction which engenders heat.

(ii) Because the oxygen gas which supports burning is spent out.

(iii) Because sound can travel only in a material, be it air, gas, liquid or a solid.

(iv) So that the iron rim may expand and be just loosely fitted to the wheel. On cooling it contracts and thus gets tightly fitted to the wheel.

GENERAL
OR
EVERYDAY SCIENCE

GENERAL

OR

EVERYDAY SCIENCE

Q. 1. Write short notes on the following :—

(1) Vitamins (2) Penicillin (3) Enzymes (4) Milk Teeth and Wisdom Teeth (5) Plastic Surgery (6) Malaria (7) Virus (8) Glands (9) Blood Pressure (10) Typhoid fever (11) Antibiotics (12) Anaesthetics (13) Nuclear Fission.

Ans. (1) Vitamins. Vitamins are complex organic compounds which are normally present in the food a man takes, and if some or any of them are absent in a particular kind of food we constantly take, we are prone to fall a victim to certain diseases like scurvy, pellagra, beri beri, rickets etc.

A number of vitamins have been discovered by scientists, the most important of which have been named as Vitamin A, Vitamin B, Vitamin C, Vitamin D and Vitamin E etc, etc.

Vitamin A is contained in milk, butter, egg-yolk, spinach, codliver oil, halibut etc. It is necessary for growth, and those people who do not take sufficient quantities of any of these foods may have a stunted growth, suffer from dryness of the skin, night blindness, various paralysis, loss of weight and are generally susceptible to diseases.

Vitamin B is contained in green vegetables, tomatoes, eggs, milk, yeast, nuts, in the germ and husk of peas, beans, cereals etc. Its absence causes beri beri.

Vitamin C is contained in limes, oranges, lemons (green vegetables), tomatoes etc. Its absence causes scurvy.

Vitamin D is contained along with vitamin A in fatty foods and prevents rickets.

Vitamin E is found in green vegetables and cereals and is necessary to fertility.

(2) **Penicillin.** A recently discovered antibiotic drug which has completely revolutionised medical treatment. It is non-poisonous to the human body, yet kills many types of germs giving rise to many diseases, e.g., Pneumonia, Gangerene, Meningitis, Syphilis, Gonorrhea.

(3) **Enzymes** are organic catalysts secreted by living organisms, very small quantities of which can bring about chemical

changes. One of such enzymes is *invertase* which converts sugar-cane into glucose, another is *diastase* which converts starch into sugar.

(4) **Milk Teeth** are teeth which appear in human beings from the age of 6 months to $2\frac{1}{2}$ years, and number 20.

Wisdom Teeth are the 3rd molars, which sometimes do not appear until the age of 25.

(5) **Plastic surgery.** Surgical operations to repair seriously damaged tissues. It has been so much developed that surgeons can now "restore faces that have been almost entirely destroyed, replace burnt skin, mend damaged nerves, and perform many other surgical marvels."

(6) **Malaria.** A very common disease, chiefly prevalent in the tropics during summer months, produced by the bite of mosquitoes which contain the malarial parasites. The parasite completes its growth in the human blood where its toxins cause the fever. It is easily curable with quinine and synthetic preparations like paludrine, plasmoquin and atebirin. The control of the disease depends upon the control of mosquitoes.

(7) **Virus.** Extremely minute different types of organisms which cause such diseases as rabies, yellow fever, typhus, mumps etc.

(8) **Glands.** Name given to various structures in the bodies of living beings whose function is the secretion and excretion of substances necessary to the growth of the body and the elimination of waste products.

There are three types of glands in the body.

(i) **Lymph Glands** which occur mainly in the various joints of the body such as armpit and groins. Their function is to trap any infection and prevent its reaching vital organs.

(ii) **Large glands**, such as liver and pancreas which produce digestive agents and they pour their secretions into the intestines through their ducts.

(iii) **Endocrine glands** or ductless glands, so called because they pour their secretion directly into the blood stream and have no ducts. These glands control important functions of the body.

(9) **Blood Pressure.** The condition commonly known as blood pressure means high blood pressure. It is a symptom of many diseases, e.g., kidney or internal poisoning during pregnancy. The high blood pressure is most generally due to the action of the heart in forcing the blood out of the left ventricle into the arterial

system whose elastic muscular coating has degenerated and resists the passage of the blood. Constant high blood pressure is very dangerous and a doctor must be consulted and the patient undergo a regular treatment, otherwise there is likelihood of an apopleptic stroke or the bursting of an artery in the brain.

(10) **Typhoid fever or Enteric.** An infectious fever caused by eating infected food or drinking infected water. Its course can be divided into three stages. In the first week there is fever, headache and general malaise. In the second week the fever reaches its maximum ; there may be diarrhoea, and a rose coloured rash on the chest or abdomen. In the third week there is an improvement if the patient is going to recover, otherwise complications like Pneumonia set in. It is a very infectious disease and can be prevented by preventive inoculation.

(11) **Antibiotics** are chemical substances secreted by living organisms which kill or render ineffective the activity of bacteria in the human body. Thus the most widely used antibiotic of our time—*penicillin*—is prepared from certain kinds of moulds. So is streptomycin and other wonder drugs of our day.

(12) **Anaesthetics.** Anaesthetics are drugs which produce a temporary loss of sensation or consciousness, either in the whole of the body or a part of it, according to the special drug used. The harmless synthetic substance novocaine is a good anaesthetic, so also ether, chloroform, ethyl chloride and the gases ethylene, acetylene, cyclopropane etc.

(13) **Nuclear Fission.** Scientists have found that when the nucleus of atoms of a highly radio-active element like Uranium are **bombarded with neutrons**, a veritable nuclear explosion occurs. The compound nucleus splits into a number of fragments. There are two main fragments each of roughly half the mass of the original nucleus of the atom. In addition two or three neutrons are emitted and the expulsion of some particles is also said to take place. *This form of disintegration is called nuclear fission.*

Q. 2. What is :—

(a) An artery (b) Astigmatism (c) a Commutator (d) a Corolla (e) a Cotyledon (f) a Ductless gland (g) an electro-magnet (h) Glycogen (i) Hibernation (j) Incubation (k) Pasteurization (l) Pollination (m) a septic tank (n) a spore (o) Villus (p) a water cycle (q) Duralumin.

Ans. (a) A blood vessel which carries blood away from the heart is an artery (b) Astigmatism is a defect of the eye which prevents light from coming to a point of focus on the retina, thus causing blurred images (c) A commutator is a device for changing

the direction of flow of an electric current. (d) The petals of a flower taken together is a corolla. It is the inner 'leaves' of the flower immediately surrounding the stamens and pistil. (e) The leaf of the embryo or a seed leaf which contains stored food for the young plant is called the cotyledon. (f) A ductless gland is that gland whose hormones pass directly into the blood stream. The spleen is one such ductless gland. (g) An Electromagnet is a soft iron core surrounded by a coil of insulated wire through which a current is passed. (h) Glycogen is an animal starch manufactured by the liver. This is the form of carbohydrates (i.e., starch) which the body stores in the liver. (i) The state of remaining inactive during winter, as found in animals like frogs, is called hibernation. (j) Incubation is the process of maintaining eggs under favourable temperature conditions so that they may hatch or develop. Thus sparrows, fowls and pigeons are commonly observed to sit on their eggs to hatch them. (k) Pasteurization is the process by which germs in milk are killed by heating the milk to a temperature of 144°F for 30 minutes. (l) Pollination is the transfer of pollen from stamen to pistil. (m) A septic tank is an underground tank that kills the harmful effect of sewage by means of bacteria. (n) A spore is a reproductive cell produced by a non-flowering plant, such as a fern, which develops into a plant like its parent. (o) Villus is one of the tiny hair like projections of membrane in the small intestine that aids in absorbing digested food. (p) Water cycle is the cycle of evaporation and condensation which water goes through in nature. (q) Duralumin is an aluminium alloy, as strong as mild steel, used in structural parts or 'air frames' of an aeroplane.

Q. 3. Explain briefly the following :—

- | | |
|---------------------|-----------------------|
| (a) Hybrid Vigour | (d) Crop Rotation |
| (b) Random Sampling | (e) Balance of nature |
| (c) Blood groups. | |

Ans. (a) Hybrid vigour. The marked vigour exhibited by the offspring produced by the crossing of two parents with contrasting characteristics or different species. Well known example is the mule.

(b) Random Sampling. Samples taken at random of any group under survey for statistical or other purposes.

(c) Blood groups. "Selection of population distinguishable by differences in their blood, blood characteristics enabling such distinction to be made. This is of great importance in blood transfusion and may be of use in cases of disputed paternity."

(d) Crop Rotation. Cultivation of a different crop each year over a period of years to prevent soil exhaustion.

(e) **Balance of Nature.** The term refers to a condition in a given locality where each kind of living thing continues to exist in about the same numbers from year to year. If a certain species rapidly outgrows its number, natural calamities overtake it, and destroy it, till it grows to its normal number again and this cycle goes on.

Q. 4. Complete the following statements by supplying the proper word or words.

(i) —is the study of weather and the factors that determine it.

(ii) A bird's bones are light because.....this is an—
for flying.

(iii) Many of the factors of our environment have lost their real meaning to us because—

(iv) A mercury barometer at sea level should read (60), (34), (30) inches.

(v) A fireless cooker makes use largely of (i) Radiation (ii) Convection (iii) Conduction.

(vi) The elements—and—make three-fourths of the weight of the earth's crust.

(vii) An artificial fibre made from air, water and coal is (i) Rayon (ii) Nylon (iii) Celanese.

(viii) Permitting soil to remain idle for a season is known as (crop rotation) (fallowing) (dry farming).

(xi) —are the blood vessels that have valves.

(x) The liver stores—as a source of reserve energy.

Ans. (i) Meteorology is the study of weather and the factors that determine it.

(ii) A bird's bones are light because they are partly hollow. This is an adaptation for flying.

(iii) Many of the factors of our environment have lost their real meaning to us because they are so close to us in everyday living.

(iv) A mercury barometer at sea level should read 30 inches.

(v) A fireless cooker makes use largely of radiation.

(vi) The elements oxygen and silicon make up three-fourths of the weight of the earth's crust.

(vii) An artificial fibre made from air, water and coal is nylon.

(viii) Permitting soil to remain idle for a season is known as fallowing.

(ix) Veins are the blood vessels that have valves.

(x) The liver stores glycogen as a source of energy.

Q. 5. (a) Why are flowers brightly coloured ?

(b) Why are fossil shells found in chalk ?

(c) Why is Assam liable to earthquakes ?

(d) How do bats fly at night ?

(e) Why do some kinds of birds migrate ?

Ans. (a) To attract bees for the purpose of pollination ; the pollen being carried by bees on their feet and wings to fertilize the ovary.

(b) Because chalk is composed of the crushed shells and calcareous remains of minute sea animalcules.

(c) Because Assam lies along the geological fault line along the foot of the Himalayas.

(d) Though bats cannot see in the night but a succession of bursts of supersonic vibrations lasting about $\frac{2}{100}$ of a second at a frequency averaging 50,000 per second is emitted from the larynx. The echoes reflected from nearby objects to the ears of the bat appear to give it precise information about its surroundings. Thus it is the echo-location of the bats which helps them locate their prey in darkness and to avoid obstacles and to fly at ease.

(e) Birds migrate in large numbers over immense distances in order to breed in colder climates and spend the cooler season in warmer regions.

Q. 6. Explain briefly the use of the following in War.

(a) Destroyer (b) Submarine (c) Radar (d) An Aircraft-carrier (e) Cruiser (f) Tank (g) Corvette (h) Dive Bomber (i) Atom Bomb (j) Paratroop (k) Uranium.

Ans. (a) During wartime a destroyer is used for the protection of merchant shipping, and the main fleet from torpedo attacks.

(b) The submarine is used to destroy enemy merchant shipping and to cut off the enemy supply line. In both the World Wars the Germans used it in a ruthless campaign against their enemy and neutral shipping. Its most powerful weapon was the torpedo. They are also used for mine laying.

(c) The greatest use to which the Radar is put during war-time is the detection of the presence of enemy aircraft by reflected short radio waves. It enables the operator to locate also the position and direction of movements of the enemy aircraft in space, even

through darkness, cloud or fog and thus its attack can be very effectively met.

(d) The aircraft-carrier, as its very name clearly indicates, is a big sea-going aerodrome used to carry a number of aircraft, which are loaded with bombs to attack enemy targets. Where an aerodrome is not available, as when attacking a distant enemy country from the sea, the aircraft-carrier comes readily to hand.

(e) The cruiser is used to convoy merchant ships and troop-ships and to pursue enemy armed ships and merchant ships. On account of its high speed, adequate protection and substantial armament, it is also used to patrol the principal ocean highways and thus keep them clear of enemy raiders.

(f) Tanks being armoured fighting vehicles are now the most widely used vehicles employed to carry troops and smash the lines of defence. The hull carrying troops is made of steel, while machine-guns and big guns are mounted on it. It proved to be the most effective weapon in modern warfare. The First World War clearly demonstrated its extreme utility. Even the dive strafings carried on by the American aeroplanes unloading as of high grade bombs did not prove effective in checking the downward march. Tanks can only be met by tanks and anti-tanks and by nothing else.

(g) The corvette is a vessel of a type of man-of-war and is used for convoy purposes.

(h) The dive bomber dives low at its target and is therefore when accurate strafing of the object to be attacked is required. It would be readily riddled by a hail of bullets from anti-aircraft. It is used only when the objective must be destroyed whatsoever the fate of the dive bomber and its crew.

(i) The atom bomb has been used only twice, once on Hiroshima, when it killed about 60,000 people and again on Nagasaki, when it wrought about the same amount of havoc. To what use it will be put in any next war is yet to be seen, for its destructive power is so terrible and consequences so awful that it is unthinkable whether it will be extensively used to force a decision in any future war or it will be replaced by the still more powerful, hydrogen bomb.

(j) Paratroops, i.e., troops carried by means of parachutes, are used to land behind enemy lines unnoticed by him, to serve as fifth column, to disrupt his lines of supply, to destroy his bridges, to surprise and unnerve him by attack from his rear and to make as much confusion as possible in all his activities to bring about his rapid collapse.

(k) This element has been used for the manufacture of the atom bomb and therefore is the most used and sought for element for purposes of war.

Q. 7. (a) What is the composition of cow's milk ?

(b) Why does an iceberg float ?

(c) Why are the smallest animals able to exist without any blood, while the largest animals have red blood ?

(d) Why are bags of oil thrown overboard from a ship in difficulty in a stormy sea ?

(e) Why are birds not struck dead when they alight on a high tension wire ?

(f) Why does the growing of leguminous crop improve the soil ?

(g) Why does an iron ship float on water while an iron ball sinks ?

(h) Why does a blotting paper absorb ink ?

(i) Why does hot food remain hot or a cold one cold in a vacuum Thermos flask ?

(j) Why does a wound begin to fester if not covered up and sterilized ?

(k) Why do we have leap years ?

Ans. (a) The cow's milk contains fat, casein, albumen, ash and lactose.

(b) Because volume for volume it is lighter than water.

(c) The innermost cells of a big animal are long way from the surface, and therefore, food and air cannot diffuse to them from the body surface. For this reason big animals require special organs to meet their needs of oxygen of the air and food to reach each of their cell. This they do by dissolving air and suitably prepared food in the liquid called blood, which is pumped through pipes in every cell of the body. Now this blood is red because it contains the substance Haemoglobin which combines with oxygen (without which no one can live) and which is thus carried to the tissues. Red blood is thus the stream of life for all large animals. Blood also carries nourishment to the cells of the body.

Small animalcules do not require any blood because relative to their bulk they have a large surface and so take in a good deal of air through their skin. They have also a system of air pipes ramifying through their bodies and they thus easily get the oxygen they require for their muscles and active life.

(d) Because the oil from the bags will spread over the surface of the sea and will act like a thin sheet of skin to prevent the raging waves from rising higher and higher. It will thus act like cold water or a cover thrown on boiling milk that is going to boil over.

(e) Because a bird does not touch ground and therefore the electric current simply passes through its body.

(f) The roots of leguminous plants (e.g., clover) frequently bear small nitrogenous nodules which restore nitrates to the soil and thus help to restore its exhausted fertility.

(g) This is due to the fact that volume for volume, the weight of the water displaced by the iron ship is greater than the corresponding weight of the ship, and therefore on the principle of Archimedes the ship does not sink. The iron ball sinks, because the weight of the amount of water it displaces is much less than that of the ball.

(h) Because the blotting paper has a porous surface and therefore absorbs the water of the ink. If its surface were glazed it would cease to absorb the ink water.

(i) This is due to the fact that on account of the vacuum and the high polish of the glass inside, the heat is not radiated away.

(j) A wound begins to fester on account of the bacteria settling on it if it is not sterilized and plastered with antiseptic medicine.

(k) We have leap years because of the difference between the calendar years of 365 days and the equinoctial years of 365.2422 days. We have therefore to add one day to make up the difference and this is done every fourth year, when February has 29 days instead of the usual 28.

Q. 8. Complete the following sentences by filling in the gaps :—

- (i) Sir Alexander Fleming first discovered.....
- (ii) From pitchblend was isolated the metal.....
- (iii) St. Paul's Cathedral was designed by.....
- (iv) Many lives of miners have been saved by Sir Humphrey Davy's.....
- (v) The science which deals with heredity is known as.....
- (vi) The unit for measuring a ship's speed is.....
- (vii) William Harvey first demonstrated the.....
- (viii) Sir Henry Bessemer discovered a process for manufacture of.....
- (ix) The tree from whose bark a specific medicine for malaria is obtained is called.....
- (x) Gregory Mendel formulated an important law of.....

Ans. (i) Sir Alexander Fleming first discovered *penicillin*.

(ii) From pitchblend was isolated the metal *Radium*.

(iii) St. Paul's Cathedral was designed by Sir *Christopher Wren*.

(iv) Many lives of miners have been saved by Sir *Humphrey Davy's Safety Lamp*.

(v) The science which deals with heredity is known as *Genetics*.

(vi) The unit for measuring a ship's speed is a *knot*.

(vii) William Harvey first demonstrated the *Circulation of blood*.

(viii) Sir Henry Bessemer discovered a process for the manufacture of *steel*.

(ix) The tree from whose bark a specific medicine for malaria is obtained is called *Cinchona*.

(x) Gregory Mendel formulated an important law of heredity (or organic inheritance).

Q. 9. What is :—

(a) **Numismatics**

(f) **Necromancy**

(b) **Philately**

(g) **Chemotherapy**

(c) **Cartography**

(h) **Bio-Chemistry**

(d) **Ornithology**

(i) **Aerodynamics**

(e) **Sericulture**

(j) **Entomology**

Ans. (a) **Numismatics** is the study of coins especially as it throws light on the history of the states or other authorities which issued them.

(b) **Philately** is the study and collection of postage stamps.

(c) **Cartography** deals with map-making.

(d) **Ornithology**. The scientific study of birds, their origin, classification, structure and habitat.

(e) **Sericulture** is silkworm-breeding for the production of raw silk.

(f) **Necromancy** is the attempt to obtain knowledge of future events by conjuring up the spirits of the dead.

(g) **Chemotherapy** is the name given to a branch of medicine which involves the use of drugs leading to the destruction of germs, without harming the body tissues.

(h) **Bio-Chemistry.** It is the branch of science which investigates the chemical process in organic matter and its by-products. It studies all physiological questions, such as the ways and means by which food and other materials are used in the body (metabolism). For this purpose a special study is made of hormones, enzymes, vitamins, secretions of ductless glands etc.

(i) **Aerodynamics.** Branch of science that studies the behaviour of bodies moving through the air and of moving air passing over stationary bodies. It is thus the basis of aircraft designs.

(j) **Entomology.** The science of insects in all their aspects, such as their evolution, distribution and classification.

Q. 10. What did the following scientists contribute to the advancement of science :—

(a) Archimedes

(b) Roger Bacon

(c) Frederick G. Banting

(d) Emil Von Behring

(e) Alexander Graham Bell

(f) Marie Sklodowska Curie

(g) Charles Darwin

(h) Lee de Forest

(i) Thomas Alva Edison

(j) Michael Faraday

(k) Benjamin Franklin

(l) Galileo Galilei

Ans. (a) Archimedes discovered relationship between buoyancy and displacement of fluids known as Archimedes' Principle. He also discovered the laws of the lever.

(b) Roger Bacon's contribution to the advancement of science lay in the fact that he insisted upon proving every scientific statement by experiment and not guess work and not merely relying upon authority, however ancient and universally accepted. He thus laid the foundation of the modern system of scientific research.

(c) Banting's investigations into internal secretions of the pancreas resulted in discovery of the insulin cure for diabetes.

(d) E. Von Behring developed an antitoxin to prevent a cure for diphtheria.

(e) Alexander Graham Bell invented the telephone.

(f) Madame Curie made researches in radio-activity and discovered the cancer curing element radium and the element polonium.

(g) Charles Darwin is the founder of the modern theory of evolution.

(h) Lee de Forest invented audion bulb which made possible radio transmission and reception.

(i) More than a thousand inventions or improvements of older ones are to Edison's credit; chief of which are: the carbon

transmitter, the phonograph, the incandescent electric lamp, a new type of storage battery, the moving picture camera, multiplex telegraphy etc.

(j) Faraday discovered electromagnetic induction which resulted in the development of the first electric generator. He was the first to make a dynamo.

(k) Benjamin Franklin's name is associated with the discovery of the identity of electricity and lightning.

(l) Galileo discovered the laws of freely falling bodies. He invented also the first practical telescope, the hydrostatic balance, the pendulum to regulate clocks, and improved the microscope, etc. etc.

Q. 11. Briefly explain the following :—

- | | |
|-----------------------------|--------------------------|
| (i) Plastics | (iv) Sulpha drugs |
| (ii) Radar | (v) Cyclotron |
| (iii) Jet propulsion | |

Ans. (i) **Plastics** is the term applied to a number of organic materials, mostly of synthetic or semi-synthetic origin, which pass through a plastic stage during manufacture and may be shaped by heat and pressure.

(ii) See part (c) Q. 17 for Radar.

(iii) **Jet propulsion.** See part (a) Q. 17.

(iv) **Sulpha drugs.** See answer to Question 39 (a).

(v) **Cyclotron.** An electrical and magnetic device which accelerates atomic particles to bombard nuclei of atoms.

Q. 12. (a) What is meant by the 'quick' freezing of foodstuffs ?

(b) **Why does oil thrown on a rough sea make it calmer ?**

(c) **What is the essential difference between a rocket and a Jet engine ?**

(d) **What is the difference between neon and fluorescent lighting ?**

Ans. (a) Foodstuffs are first strongly heated, like boiling of milk and then quickly frozen and contained in sealed cans to save them from the harmful effect of bacteria.

(b) It makes a sort of lather on the surface of the sea and thus calms it down.

(c) In a rocket forward motion is given by the thrust of the escaping gases. It carries its own fuel and oxygen for combustion within itself. In a jet engine the escaping gases issuing from the rear rotate a mechanism which produces motion. Its oxygen is obtained from the atmospheric oxygen.

(d) In the neon lighting the neon gas gives a brilliant red-orange glow, by help of an electric charge when the gas is under low pressure.

In fluorescent lighting, the gas in the lamp is argon and a speck of mercury. The light in this form is white and is the result of the crystal fluorescing, which the ultra-violet rays produced in this lamp make the crystals to glow.

[Note. The crystals are of zinc sulphide or zinc beryllium silicate. They are coated on the inside of the tube].

Q. 13. What are the contributions of the following scientists to the advancement of science ?

State also their nationality and when they lived :—

- | | |
|----------------------------|------------------------------|
| (i) Heinrich Hertz | (vii) Gregor Mendel |
| (ii) Edward Jenner | (viii) Sir Isaac Newton |
| (iii) James Prescott Joule | (ix) Louis Pasteur |
| (iv) Antoine Lavoisier | (x) Stephenson |
| (v) Joseph Lister | (xi) Count Rumford |
| (vi) Guglielmo Marconi | (xii) Evangelista Torricelli |

Ans. (i) Hertz discovered and investigated the existence of electromagnetic waves, now used in radio communication. He thus laid the foundation of the Radio (1857-94-German).

(ii) Jenner discovered modern vaccination, which has helped in rooting out smallpox (19th Century-English).

(iii) Joule demonstrated on experimental grounds the doctrine of the conservation of energy. He also determined the mechanical equivalent of heat (1818-89-English).

(iv) Lavoisier discovered the composition of the atmosphere ; explained the phenomenon of combustion, overthrew the 'phlogistic' doctrine ; stated that matter can neither be created, nor destroyed (1743-94-French).

(v) Lister is the founder of antiseptic surgery. His antiseptics have made modern surgery so safe (1827-1912-English).

(vi) Marconi is the inventor of the commercial wireless telegraphy (1874-1937-Italian).

(vii) Mendel's researches on heredity laid the foundation of the modern scientific study of this subject (1822-84-Austrian).

(viii) Sir Isaac Newton is the author of the Laws of Universal Gravitation. His three laws of motion are the foundation stones of statics and are of universal application in Physics. He also

discovered the composition of white light and is the founder of Differential and Integral Calculus (1642-1727-English).

(ix) Louis Pasteur invented the method of preservation called pasteurization. He also discovered treatment for hydrophobia (the insanity resulting from a mad dog bite). He is the author of the Germ Theory of Disease (1822-95-French).

(x) Stephenson is the inventor of the steam-engine (1771-1848-English).

(xi) Rumford's great contribution to science was the recognition of heat as a form of energy (1753-1814-American-British).

(xii) Toricelli invented the mercury barometer, by which he proved the existence of atmospheric pressure (1608-47-Italian).

Q. 14. Explain the use to plant life of the following : root, stem, leaf, flower and seed.

Ans. Roots. For fixing the plant in the earth and for drawing up sap from the soil.

Stem. The stem bears leaves and flowers and maintains communication between the roots and the leaves.

Leaves. Leaves are the breathing organs of plants. They develop chlorophyll, the green colouring matter, which (*i. e.*, the chlorophyll) effects assimilation of the carbon in the air by its power of harnessing part of energy of sunlight. Thus without the leaves there would be no food for and growth of the plant. Leaves are aptly described as the food manufacturing factories of the world.

Flower. The flower is the reproductive part of the plant. Its shape, colour and scent are specific side to the process of reproduction, as these attract the bees, butterflies etc. which act as the fertilizing agents. It thus helps in carrying on the species.

Seed. It is the seed which has in it the germ of the roots and the stem, also the food store for the new plant. The seed is the starting point of a new plant.

Q. 15. (a) Why is aluminium a good metal for making cooking utensils ?

(b) What is meant by short sight and long sight ?

(c) How do spectacles correct long sight and short sight ?

(d) What is the use of oxygen in medical treatment ? Mention any other use to which it is put.

(e) Explain the distinction between stethoscope and stereoscope.

(f) What is D. D. T. and what is it used for ?

Ans. (a) Aluminium has a low specific gravity. It is also fairly hard and is very resistant to atmospheric corrosion. This combination of valuable qualities renders it suitable for domestic cooking utensils.

(b) Short-sightedness or Myopia is the inability to see distant objects distinctly. This is due to the surface of the cornea being too long so that parallel rays of light are brought to a focus in front of the retina. This defect can be removed by using a spectacle with a concave lens.

(c) Long-sightedness or hypermetropia is the inability to see near objects. This can be remedied by using a spectacle with a convex lens.

(d) Oxygen is used in industry for welding of metals in conjunction with acetylene as it forms the intensely hot oxy-acetylene flame. By the doctor it is used to help his patient for artificial breathing.

(e) A *Stethoscope* is an instrument used for hearing the sound of heart and lungs etc. while a *stereoscope* is an optical instrument for representing to the eyes as single object in relief two views of the same object taken from slightly different angles.

(f) D. D. T. is short for dichloro diphenyl trichloroethane. It is a good insecticide, killing bed-bugs, houseflies, mosquitoes and cockroaches etc.

Q. 16. Explain the difference between :—

- (a) Coal and coke
- (b) Ice and snow
- (c) Mist and fog
- (d) Petrol and Kerosene
- (e) Star and planet

Ans. (a) Coal is a combustible material composed mainly of carbon, with oxygen, hydrogen and nitrogen as other of its ingredients in small proportion to the carbon content. Coke is a derivative of coal produced by the carbonization of certain types of coal. When coal is strongly heated in airtight ovens, all its volatile constituents are released and what is left behind is the brittle silvery grey **Coke**.

(b) Ice is the solid form that water assumes when it is subjected to a low temperature by artificial means or when water freezes due to coolness in the atmosphere. *Ice is formed on the earth. Snow is formed in the air by the condensation of excess vapour below freezing point.*

(c) When a cloud of condensed vapour is caused by moist air

coming in contact with ground or water or by the meeting of two currents, one cooler than the other, it is called fog. Fog specially denotes that condition of such a cloud on the earth when the visibility has been reduced to less than one kilometer (i.e., less than 11.00 yards). This is called *mist* when it is not so thick, giving a visibility of one-half kilometer.

(d) Kerosene and petrol are both products obtained by the fractional distillation of petroleum or mineral oil. There is this difference between the two that whereas petrol is a highly volatile product and forms an explosive mixture with air, kerosene is not so explosive. Petrol is therefore used for motor cars, whereas kerosene cannot be used for them as it is a very stable product and can only be used as oil for lamps and other similar purposes.

(e) Planets are celestial bodies which *revolve* in elliptic orbits round the sun, whereas stars are heavenly bodies which remain fixed and do not move. Planets shine by reflected light of the sun. Stars, like the sun, shine by their own light.

Q. 17. Give brief descriptions of :—

- (a) Jet Aeroplane (b) Electron (c) Radar (d) Asdic
(e) Battleship.

Ans. (a) Jet Aeroplanes. The principle on which the jet aeroplanes are built and modelled are based on the fact that when gases under great compression are allowed to escape through a small opening or orifice they provide a reaction which gives a thrust in the opposite direction, this being directly proportional to the amount of compressed gas acceleration. In a large modern jet aeroplane the hot gases escaping at the rear may attain as much as one ton weight per minute. In the aeroplane of this design and use, the hot products of combustion are forced into a restricted chamber housing a turbine mounted on a long shaft at the forward end of which is a compressor driven by this turbine. This compresses the air and forces it into the combustion chamber under pressure where it burns with the atomised fuel. This drives the turbine, while the gases are forced out with an extremely high velocity. The great compression and the heating process and the subsequent escape of the gases at the back provide a reaction which gives the aeroplane the forward thrust. This thrust is directly proportional to the amount of air-gas acceleration.

Electron. The unit particle of negative electricity which is the ultimate constituent of the matter is called an electron. It is $\frac{1}{1840}$ of the weight of an atom of hydrogen.

Radar. This is a sensitive instrument by which the position of an object in space is located by radio waves, as also its speed and direction of movement. The principle on which it is worked is that all solid and liquid bodies reflect radio waves which are unin-

fluenced by darkness or fog or cloud. To detect any reflecting object in space it is necessary first to flood that object with radio waves. Ground reflectors are used to pick up the reflected beam and it is then possible to determine the direction of arrival of the waves and thus the direction of the radio-located object with respect to the ground station.

The distance along that direction may also be determined by timing the journey of the radio waves to the reflecting object and back. The accurate and speedy measurement of the time intervals of these waves going and coming back is the basic feature of the radio measurement of distance.

Asdic. This word is an abbreviation for Anti-Submarine Detector Indicator Committee which invented an apparatus for detecting the presence of enemy submarines under water by the use of echoes. It was used during the 2nd World War.

Battleship. It is a formidably armed, heavily armoured, and highly mobile floating fortress, which can hit harder and better repulse all forms of attacks than any other warship. It can inflict the utmost punishment on its enemy and can withstand any attack on it.

It is the most powerful fighting ship that has been possible to construct and contains the very latest equipment that can be provided to it.

Q. 18. How are the following diseases spread ? : —

(a) Cholera (b) Plague (c) Chickenpox (d) Scabbies
(e) Sleeping sickness (f) Malaria.

Ans. (a) The disease is spread by "microbic infection, the microbe being the cholera spirillum or koch bacillus, which is transmitted by means of infected water, flies, food etc."

(b) This disease is spread by fleas which have the plague germs in them. The fleas carry the germs from infected rats to human beings and the bite of the flea injects the germs into the blood stream. If rats were destroyed the disease would automatically disappear.

(c) The chicken-pox spreads by means of an unidentified virus which is so small that it passes through the bacterial filter. The virus is probably air borne, and is in the spray of coughing or speaking, but may also be transmitted to objects such as clothing or toys.

(d) This infectious disease is spread by a mite which burrows under the surface of the skin and causes extreme discomfort and itching. It is spread by people coming in contact with a person who has the disease.

(e) This disease is spread by the dreaded Tse fly (which carries the blood parasite, called trypanosomes) which bites its victim, injecting the parasite in the blood stream.

(f) Malaria is spread by the anopheles mosquito in whose saliva is contained the malarial parasite which it injects into the blood stream while piercing the skin to feed.

Q. 19. Explain briefly how a motor engine works.

Ans. The motor engine is an internal combustion engine using petrol as fuel. The energy required to give the engine the driving force is obtained by the combustion of a mixture of petrol vapour and air in the cylinders. There is fitted in the engine as part of it a carburettor. The combustible mixture of air and petrol vapour is obtained by means of this carburettor which mixes the petrol vapour and air in the proportion demanded by the engine. When the stroke is given to the piston, the mixture is drawn into the carburettor, where it is compressed and a spark is produced. After combustion has taken place the gases produced in the cylinder are at a high temperature and consequently at a high pressure and this high pressure is applied to a piston, forcing it outwards. The motion of the piston is transmitted by means of a piston rod to a crankshaft, and thence by a system of gears to the driving axle of the vehicle. As high power is required to accelerate a car from rest to high speed this is done by the gearbox which brings about the necessary gradual changes.

Q. 20. Explain briefly :—

(a) A mine sweeper (b) Tracer Bullet (c) Pom Pom (d) Air-cover (e) Turbine.

Ans. (a) A vessel equipped with special apparatus to detect the presence of mines laid by the enemy and to aid in destroying them when they have been found so as to render the seas safe for shipping purposes.

(b) A bullet which leaves a smoke trail to mark its course.

(c) Name given to one pounder quick firing shell gun, from its sound.

(d) Specially devised shelters built during war time to give cover to the civil population from attacks of the enemy bombers. In engagements during the war it also means the protection that the fighter planes provide to the army against attack of the enemy.

(e) It is a rotary steam engine in which kinetic energy of steam or water is converted into work. It consists usually of a shaft, wheel or motor, carrying a number of blades. Against

the latter are directed jets of steam which by their high pressure on the shaft cause the shafts to rotate at a high speed and thus set into motion the machines to be worked. In hydro-electric schemes it is the constant stream of water falling from great height that sets the blades of the turbine into motion; the electric energy that is obtained and stored is got from the concussion of the wheel that is set into rotation at high speed by this turbine with the skin of a cat or other animal.

Q. 21. What is :—

- | | |
|-------------------------|------------------------|
| (a) An Alpha particle | (g) A chain reaction |
| (b) Amplitude modulator | (h) Cloud seeding |
| (c) An Antibody | (i) Compression stroke |
| (d) An atomic pile | (j) A Geiger counter |
| (e) A carrier wave | (k) An Isotope |
| (f) A cathode ray tube | (l) An Iconoscope |

Ans. (a) "An alpha particle is a positively charged particle given off by certain radio-active substances."

(b) Amplitude modulator is a standard radio-broadcast wave in which the intensity of the radio wave is varied according to the sound to be produced.

(c) "An antibody is a chemical substance in the blood of animals and man which overcomes germs and their toxins."

(d) "Atomic pile is the atomic furnace in which atomic fission takes place."

(e) "A carrier wave is a high frequency radio-wave which is made to vary by the sound waves to be broadcast."

(f) "A cathode ray tube is a tube in which electrons are caused to travel at high velocities as, for example, in X-ray or television tube."

(g) "Chain reaction means a reaction caused by the bombardment of an atomic nucleus, which releases enough energy to start a series of similar reactions."

(h) "Cloud seeding means putting dry ice or chemicals into rain clouds to cause the moisture to fall."

(i) "Compression stroke is the second-stroke in a four cycle engine where the fuel and air mixture is compressed."

(j) "A Geiger counter is a very sensitive instrument used to detect radio-activity."

(k) "Isotopes are atoms of an element having the same chemical properties as the element, but different atomic weights."

conception, by a singular privilege and grace granted by God, was preserved free from all stain of original sin."

(d) The things that always co-exist. The term is specially applied to the *body* and *blood* of Christ in each of the eucharistic elements.

Q. 26. Explain the following terms briefly :—

- | | |
|-----------------------|-------------------|
| (a) A Recessive trait | (h) Villus |
| (b) A Secondary Coil | (i) A Thermostat |
| (c) Serum | (j) Light Years |
| (d) Vascular bundles | (k) Absolute Zero |
| (e) Strip cropping | (l) Galaxy |
| (f) Sun time | (m) Ecliptic |
| (g) Tagged atoms | (n) Binary stars |

Ans. (a) A recessive trait is a trait which does not appear in the offspring unless it is inherited from both parents.

(b) A secondary coil is the coil of a transformer in which current is generated by the magnetic action set up in the primary coil.

(c) **Serum.** Yellowish watery fluid which remains when blood clots. It is therefore the watery part of the blood. The term is also used for the fluid prepared for immunisation and vaccination.

(d) **Vascular bundles.** These are bundles of long tube-like cells found in the stems of plants which carry fluids up and down the stem.

(e) **Strip Cropping.** Planting crops in strips rather than in separate fields to prevent erosion from running water.

(f) **Sun time.** Time in which noon is the moment when the sun is directly over the meridian.

(g) **Tagged atoms.** Radio-active atoms used for various types of research.

(h) **Villus.** The tiny finger-like projections extending inward from the walls of the small intestine to absorb food.

(i) **A Thermostat.** It is an instrument for maintaining a constant temperature by the use of a device which cuts off the supply of heat when the required temperature is exceeded, and automatically restores the supply when temperature falls below that required.

(j) **Light Years.** A Light-year is an astronomical measure of distance and is equal to the distance travelled by light in one year, which is approximately 6×10^{12} miles.

(k) **Absolute Zero.** The lowest temperature which can possibly exist and is equivalent to -273°C .

(l) **Galaxy.** The enormous cluster of stars and other heavenly bodies, forming a belt of milky white appearance, which encircles the heaven, nearly in a great circle. It is known also as the milky way.

(m) **Ecliptic** is the name given to the circular path in the heavens round which the sun appears to move in the course of the year.

(n) **Binary stars** or double stars are those stars in which one star revolves round another giving rise in some cases to a variation in the apparent brightness. Having motions they are linked by gravitational attraction.

Q. 27. (a) What name is given to the method of signalling by dots and dashes ?

(b) What disease is aimed to be prevented by vaccination ?

(c) What does a rapid fall in the barometer indicate ?

(d) What is the normal temperature of the human body ?

(e) How is calcium carbide used for illumination ?

(f) Name an Indian bird which can imitate the human voice.

(g) What bird makes no nest of its own but uses other birds' nest ?

(h) What plant or plants entrap insects as their prey ?

Ans. (a) The Morse code.

(b) Small-pox.

(c) A rapid fall of the barometer indicates that the surrounding air has got rarefied due to moisture in it. As the variation of height of the mercury is also related to climatic conditions, usually a rapid diminution of height is followed by rain, while a rise in height by fine weather.

(d) 98.4°F .

(e) When water is added to calcium carbide, acetylene gas is produced which produces a steady flame.

(f) Parrot.

(g) Cuckoo.

(h) The pitcher plant.

Q. 28. (a) If we take two balls of iron, one ten times heavier than the other, and let them fall from a height in a vacuum, which will reach the ground first and why ?

(b) Why is hydrogen used in balloons ?

(c) Why does the flow of blood through an ordinary cut in one's finger automatically stop after some time ?

(d) If we take an empty bottle, stop its mouth with a cork, and place it in front of a fire what will happen and why ?

(e) Will there be any difference in the strength of light if a lighted candle is placed in a room with glazed white walls and next with black coated walls ? Explain why ?

Ans. (a) Both simultaneously ; because the gravitational pull on both the bodies which produces the acceleration downwards is the same whatever the weight of a body.

(b) Because hydrogen is lighter than air therefore a balloon filled with hydrogen will rise high in space.

(c) It is due to the clotting of the blood due to fibrinogen in it which produces the clotting by the blood.

(d) On account of the heat the air inside the bottle will get hotter, proportionately more rarefied and try to expand and exert pressure on the cork and sides of the bottle. Either the bottle will crack owing to this pressure or the cork will go off and let the air under pressure out. Also, since the outer surface of the glass bottle will expand more than the inner colder surface, the outer will expand more than the inner surface and hence it will crack.

(e) Yes. Light rays will be reflected by the highly polished white walls and the room will thus be much more brightly illuminated than with black walls, which will absorb the light rays falling on them and therefore the room will be comparatively much less bright in the case of the dark than the one with the glazed white walls.

Q. 29. In which part of your body is the

(a) Humerus (b) Larynx (c) Pancreas (d) Pelvis (e) Gall bladder (f) Thyroid gland (g) Scapula and the (h) Pharynx.

Ans. (a) The upper arm (b) Upper part of the throat (c) In the abdomen (d) It is the bony girdle in the middle of the body giving support to the legs (e) In the chest under the right lobe of the liver (f) In the throat at the back of the larynx (g) In the

shoulder (h) In the gullet lying behind the nose, mouth and larynx.

Q: 30. What are—

(a) A magnetic mine (b) A Bazooka (c) A Rocket Bomb (d) A torpedo (e) A mortar.

Ans. (a) A mine which has a magnetic apparatus so that when a ship is passing near, it is automatically attracted towards it by the attraction of the ship's iron for the magnet of the mine and thus comes into violent contact with its target when it explodes and sinks the ship.

(b) An anti-tank American gun heard of in the Korean War.

(c) It is an aluminium tube 5 ft. long tapering to a warhead point, carrying a ton of explosives. Below this are the radio receiver, alcohol and oxygen tanks. When fired it rises to a height of 70 miles and attains a speed of 3000 miles per hour and is aimed at the object (whose location has been accurately ascertained) to be destroyed by gyroscopic control. This type of bomb, called the V₃ bomb by the Germans was first used by them during 1944-45 and London was its special target.

(d) A self-propelled submarine weapon of offence, usually cigar shaped carrying a charge of gun cotton.

(e) A short and very thick piece of artillery of large calibre, firing a heavy shell at a fixed angle of 45° or thereabout.

Q. 31. (a) Why does ice float in water ?

(b) What sicknesses are associated with the following ?

(i) Anopheles (ii) Tsetse (iii) The rat flea.

(c) Give the name of the two stars nearest to the earth.

(d) What is a balanced diet ?

(e) What is an amphibious tank ?

(f) How do you convert Fahrenheit temperature into Centigrade ?

Ans. (a) Ice floats in water because volume for volume, ice is lighter than water.

(b) (i) The anopheles mosquito causes Malaria. (ii) The Tsetse fly causes the disease *nagana* in animals and *sleeping-sickness* in man. (iii) The rat flea causes plague in man.

(c) Mercury and Venus are the nearest planets to the earth.

(d) A balanced diet is that which contains all the nutrients, i.e., carbohydrates, fats, proteins, vitamins and mineral salts in right proportion to enable a person to keep good health.

A certain amount of energy is needed to keep the body warm and to provide for the working of the heart and other organs. A man who is merely resting requires a diet which will furnish about 1700 calories per day. A man leading a sedentary life may need 2100 calories, while those doing heavy manual labour require up to 5000 calories. The food that supplies this much energy respectively to all these types of people and is not deficient in any of the aforementioned ingredients is a balanced diet.

(e) An amphibious tank is a tank which can cross rivers, climb banks, and proceed on land, developing over ground quite a good speed.

(f) To turn Fahrenheit temperatures to Centigrade temperatures, the rule is : subtract 32, then multiply by $\frac{5}{9}$. For example:—

$$17^{\circ}\text{F} = \frac{(17-32) \times 5}{9} ^{\circ}\text{C} = \frac{-15 \times 5}{9} = -8.3^{\circ}\text{C}$$

Q. 32. (a) Name two men, two processes, and two inventions that have contributed much to our present industrial world.

(b) Give in order all the necessary steps in starting an automobile engine and setting the car in motion. What is accomplished by each step?

(c) Describe as fully as you can the composition of the earth's crust?

(d) What elements have reached the earth from outer world?

(e) How does the passage of liquids in a stem differ from the circulation of the blood in our bodies?

(f) What are the methods by which fuel values of foods may be determined?

(g) Is alcohol a food? Why is it so harmful to the body?

(h) State some ways in which bacteria is helpful to man?

Ans. (a) (i) Edison and Watt; (ii) making steel and producing electricity (iii) the dynamo and the steam engine.

(b) (1) The first step is to insert a key in the ignition lock and turn it. (2) This sets an electric current from a storage battery to flow to the starter, to the transformer coil and to the spark plugs

(3) pressure is next made on the starter which sends a current through the powerful starter motor. (4) The shaft of the starter motor is connected by gears to the crankshaft of the engine. The pistons are moved up and down in the cylinders by the rotary motion of the crankshaft, and when the first 'pop' of the engine is heard, the foot is removed from the starter pedal and the forward motion is given to the motor.

(c) The average composition of the earth's crust by weight including rocks, air and water is estimated to be as follows :—

(i) Oxygen 50% (ii) Silicon 25% (iii) Aluminium 7% (iv) Iron 4% (v) Calcium 3%. The remaining elements about $2\frac{1}{2}\%$ each are Sodium, Potassium, Magnesium etc.

(d) Iron, nickel, silicon and some 27 other elements known to us.

(e) In a stem, the liquid must pass from cell to cell, while in our bodies the blood has definite 'pipes' or blood vessels through which to pass.

(f) The method used for measuring the fuel values of food is as follows :—

A measured quantity of the food to be tested is dried and is placed in the inner chamber of an air-tight, insulated container known as a *bomb calorimeter*. Oxygen under pressure is introduced into this chamber. An outer chamber contains water. A high temperature produced by an electric current causes the sample of food to be burned. The resulting heat is absorbed by the water and from it the fuel value, in Calories, can be found. Since a pound of water can be heated 4°F by one Calorie it has thus been estimated that one pound of fat or oil can produce more than 4200 Calories, and this is 2.3 times as much heat as can be obtained from the same amount of carbohydrates or protein.

(g) Alcohol is composed of carbon, hydrogen and oxygen. As there is absence of nitrogen and mineral elements, alcohol cannot build tissues. It has also been found by experiments that it does not act as a fuel substance in the body in the same way that starch and sugar act. Alcohol, therefore, is not a food.

Its use has definite harmful effects on the body. It interferes with the digestive processes by :—

(i) Reacting chemically with protein foods and making them harder to digest.

(ii) It irritates the delicate lining of the alimentary canal.

(iii) It interferes with the chemical action of digestive juices.

(iv) It causes diseases of the liver and kidney.

(v) It injures the muscles of the heart.

(vi) It produces disorders of the nervous system.

(vii) It dulls the senses, judgment and memory.

(viii) It disturbs muscular co-ordination.

(h) Bacteria which are useful to man help him in the following ways :—

(i) Food such as cheese and butter are given their flavour by bacteria. Bacteria help in fermentation producing yeast, vinegar etc. Nitrogen fixing bacteria help to make soil more fertile. The elements present in the compounds of dead organic matter and in sewage are released by the action of decay bacteria. Thus are removed great quantities of matter that would cover the earth and be a menace to health. In addition, the industries that produce leather, sponges and linen depend on the action of bacteria to remove the unwanted portions of the raw material by causing them to decay.

Q. 33. Complete the following statements by supplying the proper word or words :—

(a) A gas other than hydrogen used for inflating dirigibles is—

(b) The unit of electric current is (ohm) (watts) (ampere).

(c) In electroplating the object to be plated is connected to the (positive terminal) (anode).

(d) A person who is colour-blind has difficulty in distinguishing between the colours—and—

(e) The separation of white light into its constituent colours is called—

(f) Insects are attracted to a flower by (corolla) (calyx) (chlorophyll).

(g) The soil best suited for most agricultural purposes is (clay) (loam) (sandy clay).

(h) Yeast used in bread-making produces the gas—which makes the bread.

(i) Fresh air, chemicals and—are effective in killing germs.

(j) Salt water is a mild—often used as a mouth wash.

Ans. (a) A gas other than hydrogen used for inflating dirigibles is helium.

(b) The unit of electric current is ampere.

(c) In electroplating, the object to be plated is connected to the negative terminal.

(d) A person who is colour-blind has difficulty in distinguishing between the colours red and green.

(e) The separation of white light into its constituents colours is called spectrum.

(f) Insects are attracted to a flower by its corolla.

(g) The soil best suited for most agricultural purposes is loam.

(h) Yeast used in bread-making produces the gas carbon dioxide, which makes the bread porous and helps its rise.

(i) Fresh air, chemicals and sunshine are effective in killing germs.

(j) Salt water is a mild antiseptic often used as a mouth wash.

Q. 34. How are the following obtained and made and what are their principal uses ?

(a) Coal tar

(d) Turpentine

(b) Bakelite

(e) Synthetic nitrates

(c) Power alcohol

Ans. (a) Coal-tar is the black oily material resulting from the destructive distillation of coal in gas works. Coal tar is the source of benzene, toluene, xylene, phenol, naphthalene, creosol, and also pitch and indirectly of dyes, disinfectants, poison gas, insecticides, perfumes and many drugs.

(b) Bakelite is a synthetic resin made by condensation of creosol or phenol with formaldehyde invented by L. H. Backland, whence the name. It gets highly polished and is used in place of wood or as an insulator.

(c) Power alcohol consists of a mixture of 100 parts by volume of ethyl alcohol (obtained by the fermentation of molasses, sugars etc.) $2\frac{1}{2}$ parts by volume of wood naphtha, $\frac{1}{2}$ part of crude pyridine and not less than 5 parts of petrol or benzol. It is mainly used as a fuel, as a solvent, and intermediates required in the chemical, plastic, textiles and paint industries.

(d) Turpentine is a mixture of oil or resin and in an exudation got from cuts made in the trunks of trees belonging to the pine family. It is used in paints and varnishes and in medicine as an irritant.

(e) Synthetic nitrates are commonly prepared by reacting an oxide, hydroxide or carbonate with nitric acid (which is itself produced from ammonia—a synthetic product). In some cases (e.g., potassium nitrate) double decomposition of a chloride with sodium nitrate is used. The nitrate solutions so produced are concentrated by evaporation and the salt crystallised.

The nitrates are used as oxidising agents. The most obvious form of this is in explosives and pyrotechnics. The barium and strontium salts are used in coloured fires. The principal use of the nitrates is however as nitrogenous fertilizers for crops.

Q. 35. What is the name of the animal ? :—

(a) With stripes on the whole of its body (b) with a pouch to carry its young one (c) with the largest neck (d) which resembles human beings (e) which moves with great agility but has no legs or feet (f) with a hump and a bad temper (g) which has feathers but cannot fly (h) which is a perpetual widow ?

Ans. (a) Zebra (b) Kangaroo (b) Giraffe (d) Orangutan (e) Snake (f) Camel (g) Ostrich (h) Spider.

Q. 36. What are the following :—

(a) Haemorrhage (b) Cataract (c) Coma (d) Flatulence (e) Diabetes (f) Hernia (g) Jaundice (h) Piles (i) Vaccine (j) Virus (k) Bacteria.

Ans. (a) **Haemorrhage.** Bleeding—usually due to an injury ; but it may be internal—due to an ulcer or some deficiency of vitamins or some blood disease.

(b) **Cataract.** Clouding of the lens of the eye which interferes with clear vision. Usually occurs in old people. Operation can be performed only when the cataract is mature, that is, when the whole of the lens is clouded. The degenerated lens is removed by operation and glasses are given.

(c) **Coma.** Complete loss of consciousness ; may be due to many diseases, like alcohol drinking, diabetes, cerebral haemorrhage, brain tumour etc.

(d) **Flatulence.** Gas in the stomach and intestines. There is a feeling of discomfort and the patient tries to expel the gas—that leads to swallowing of more air ; the patient again tries to expel it out and sucks in more air. Thus a vicious circle is set up and the stomach remains full of gas. The patient must try to resist this effort of bringing up the wind.

(e) **Diabetes.** A disease of the pancreas in which there is deficient secretion of the insulin (the secretion of the pancreas). The function of insulin is proper utilization of sugar in the body. Hence when enough insulin is not produced there is an accumulation of sugar. The blood becomes loaded with sugar and ultimately it is passed in the urine. Symptoms in the early stages may not be visible to the patient, but later there is excessive thirst and too much urine is passed. If care is not taken the patient will become weak and prone to developing a gangrene

and other ailments. Treatment is regulation of diet and injection of insulin.

(f) **Hernia.** The protrusion of a loop or knuckle of an organ or tissue through an abdominal opening. Found most commonly in the groin called Tugrinal Hernia or in the middle of the abdomen called Umbilical Hernia.

(g) **Jaundice.** Yellowness of the skin, eyes and urine due to presence of bile in the blood. It may occur due to excessive breakdown of blood, i.e., excessive formation of bile; or due to some obstruction to the outflow of bile. Bile accumulates in the blood and gives rise to yellow coloration of the eyes and skin.

(h) **Piles.** Swollen veins round the anus. They are due to pressure on the veins which prevents the free flow of blood. Pregnancy and constipation are most liable to lead to this condition. External piles are those developed outside the anus and cause itching, irritation and pain. Internal piles form inside the rectum and at first cause no trouble to the patient, but if they grow they cause pain and feeling of fullness of bowel. Mild cases can be treated by relieving the constipation, but other cases require injection or operation.

(i) **Vaccine.** It is lymph derived from a calf immune to cowpox with a view to producing a general reaction by which the subject (i.e., the person who is to be vaccinated) into whose skin the lymph has been injected develops immunity to smallpox.

(j) **Virus.** They are organisms so small that they pass through the bacterial filter. Rabbits, yellow fever, small-pox, mumps, typhus, canine distemper, and foot and mouth diseases are carried by them.

(k) **Bacteria.** Germs not visible to the naked eye causing many types of diseases.

Q. 37. Write as briefly as you can what you understand by :—

(a) A hydroplane (b) A seismograph (c) A molecule (d) Chlorophyll (e) Ampere (f) Kilowatt (g) Horse power (h) Turbine (i) Internal combustion engine.

Ans. (a) **Hydroplane.** "A form of aeroplane fitted with pontoons and made to alight on, rise from and glide upon water."

(b) **Seismograph.** It is a delicate instrument by means of which the distance and intensity of an earth tremor can be ascertained.

(c) **Molecule.** The smallest particle of an element or a compound that can have a separate existence. It can just be an atom as in the case of helium or mercury vapour, or a combination of two or more atoms as in hydrogen or sulphur vapour, or it may be complex, as in naphthane or cane sugar.

(d) **Chlorophyl.** The green colouring matter of plants formed by the action of sunlight. It is this substance which helps the growth of plants by absorbing and decomposing carbon dioxide in the atmosphere in order to produce oxygen and to form new organic compounds.

(e) **Ampere.** Unit of intensity of electric current ; or current sent by 1 volt through 1 ohm.

(f) **Kilowatt.** Unit of power equal to about $1\frac{1}{3}$ horse power.

(g) **Horse Power.** The engineer's unit of measurement. It is the rate of doing work or supplying energy equal to a rate of working 33,000 ft. pounds per minute.

(h) A turbine is any motor in which a shaft is steadily rotated by the impact of a current of steam, air, water or other fluid, directed from jets or nozzles upon blades of a wheel.

(i) An internal combustion engine is one in which energy supplied by a burning fuel is directly transformed into mechanical energy by the controlled burning of the fuel in an enclosed cylinder behind a piston. This term is usually applied to the petrol-burning engine.

Q. 38. Explain in non-technical language :—

(a) Alpha rays

(b) Cosmic rays

(c) Electron microscope

(d) Ultra Violet rays

(e) Spectrum

(f) Chromosomes

Ans. (a) Alpha rays are positively charged particles and are the positive nuclei of helium atom. Their velocity is 12,000 miles per hour.

(b) Cosmic rays. Radiation that enters the earth's atmosphere from outside and eventually reaches the earth's surface. Much of it is very penetrating, *i.e.*, it is able to go through lead even at the bottom of a mine.

(c) **An electron microscope** is a design of microscope in which the specimen is illuminated by electrons which are focussed by means of specially shaped magnetic fields. The electrons serve the same purpose as light in the ordinary optical microscope, but as they have a much smaller wave length than light, they are therefore used to observe specimens (like viruses) much smaller than could be observed by light.

(d) **Ultra Violet Rays.** Light rays invisible to the naked eye. They are that part of the solar spectrum which is beyond its violet end. Physiologically they are extremely powerful, as they produce the valuable vitamin D in the human body and therefore help in the removal of rickets and other deficiency diseases. They are also extremely germicidal and are the powerful part of the sun rays that produce sunburn. Artificially they can be produced by mercury vapour and arc lamps for therapeutic purposes.

(e) **Spectrum.** Name given to the coloured band into which the white rays of the sun break when they are passed through a prism.

The order in which the coloured bands appear are violet, indigo, blue, green, yellow, orange and red (Vibgyor).

(f) **Chromosomes.** Thread-like bodies formed from chromatin network of a cell nucleus during the process of normal cell division (the cell having been formed in the womb of the female, after the female ovum has been fertilized by the male gamete or spermatozoon). The chromosomes are supposed to be carriers of hereditary factors and changes in them are passed on from one generation to the next.

Q. 39. What diseases are treated with :—

(a) Sulpha drugs (b) Cod Liver Oil (c) Insulin (d) Neo-salvarsan (e) Bromides (f) Morphia (g) Peruvian Bark (h) Calf lymph (i) Ultra-violet rays (j) The leech (k) Chloromycetin.

Ans. (a) In the prevention and the treatment of childbirth fever, pneumonia and wound infection, specially when pus has been formed in the lungs.

(b) In diseases which are caused by the deficiency of vitamins A and D. It is given as a nutritive to meet those deficiencies.

(c) For diabetes.

(d) In the treatment of syphilis.

(e) They are used as gentle anodynes to promote sleep and in large doses for epilepsy.

- (f) As an anodyne in relieving pain and inducing sleep.
- (g) Malaria.
- (h) Small-pox.
- (i) Rickets and other deficiency diseases.
- (j) For blood letting
- (k) Chloromycetin is used for typhoid fever.

Q. 40. Describe briefly the use in war of the following :—

- (a) Depth charges
- (b) Smoke screen
- (c) Land mines
- (d) Radiolocator
- (e) Balloon Barrage
- (f) Camouflage

Ans. (a) To destroy enemy submarines. They are bombs dropped on submarines either by anti-submarine, naval craft or aircraft. They only explode below the surface of the water at desired depths. Their radius is approximately 60 ft.

(b) To hide the movements of ships or convoys in the sea and of armies on land.

(c) To retard the movement of the advancing or the pursuing enemy and to cause death and destruction amongst him by the mines exploding underneath him.

(d) The radiolocator locates the direction and movements of the enemy aeroplanes and thus helps in locating their presence and fighting them out.

(e) These prevent the enemy aeroplanes from dropping their bombs on the target, as they come in his way and destroy them if they are touched.

(f) These are simple devices to mix with and assume the colours of the surrounding object, so that the enemy is unaware that he is being watched and ambushed.

Q. 41. (a) What is meant by the "germs theory of disease"? Name some natural defences which the body has against disease. Describe in detail one of them.

(b) Mention three animals from which matter is obtained for inoculation. What type of disease is prevented by each type of inoculation?

(c) Explain briefly how fluorescent lamps are constructed. What advantages have they over filament lamp?

(d) Why do materials seem to have a different colour when observed under artificial light than when observed in day-light ?

(e) What causes colour fatigue ?

(f) Why is ice transparent while snow is white ?

(g) Why are ball bearings used in machines ?

(h) Justify the statement that friction is a necessity and an evil.

(i) What are lightning flashes ?

(j) Why is the earth considered a magnet ?

(k) Why is alternating current transmitted over long distances at high voltage ?

Ans. (a) The 'germ theory' of diseases states that practically all diseases are caused by attack of microscopic parasites which produce harmful poisons, and that each disease is caused by a different organism which attacks a definite body tissue and produces a definite toxin which poisons the body. Most important defences the body has against disease are :

1. **The living defence**, which includes the skin, hair in the nasal passage and the mucous membrane.

The tough skin prevents the entrance of harmful organism into the body ; the hair in the nasal passage act as filter to remove dust and other harmful particles that would otherwise be admitted to the lungs, while the mucous membrane has a slippery secretion called the mucous which protects the inner lining of the body from diseases.

2. *The other defence organism in the body is the white corpuscles of the blood which attack and destroy germs that have entered the body.*

3. Another defence system in the body is **Antibodies**. When germs begin to multiply and produce toxins in the body, the protoplasm responds by producing chemical 'agents', which are capable of fighting the toxins and the germs which produced them. These 'agents' are the **antibodies**. They are the last line of defence which the body has got against diseases.

(b) 1. The cow from which is obtained the cowpox to fight small-pox.

2. The horse from whose blood is prepared an antitoxin serum to fight diphtheria.

3. The rabbit from injections of whose spinal cord hydrophobia or rabies is controlled.

(c) The fluorescent lamp is constructed as a round tube and sealed in the same way as the ordinary electric light bulb, but whereas in the electric-light bulb, inactive gases, such as nitrogen are pumped into the bulb, in the fluorescent tube, the gas is argon with a speck of mercury. When an electric current flows through the fluorescent bulb, mercury vapour conducts the electricity from one end of the tube to the other end and ultra-violet rays are radiated. On the inside of the fluorescent tube are thin layers of chemicals which glow when struck by the ultra-violet rays. These things are absent in the ordinary arc light lamps.

The fluorescent lamp has this advantage over the filament lamp that, with the amount of electricity used, it provides more illumination. Furthermore, the colour of the light obtained from a fluorescent lamp can be controlled by the choice of chemicals painted on the inside of the tube.

(d) This is because artificial light has not all the seven colours of the spectrum. Suppose we have an object which absorbs all the wave lengths of the sunlight except red, then the object will appear red. This same object is now exposed to artificial light, which has fewer wave lengths than those in the sunlight, then naturally the object will have fewer wave lengths to absorb. Also the artificial light may not have the wavelength which the object absorbs. Hence it will appear different from the red under the sunlight.

(e) Very bright colours in bright light fatigue the eye and brain by their unusual glare.

(f) Ice is transparent because like glass it lets light rays pass through it, while snow absorbs all the rays of light.

(g) To reduce friction.

Rolling friction is much less than sliding friction and on this account ball bearings are used in machines; for if there were no ball bearings only sliding friction will come into play in the machinery parts, thus rendering them less efficient in work, reducing their speed and increasing wear and tear.

(h) "When working a machinery much force has to be spent to overcome frictional forces that come into play. The moving parts of machinery also become worn out as a result of friction. Heat is also generated wherever friction is present between moving surfaces; this heat is often very dangerous to machinery. It is therefore the attempt of designers and engineers to reduce friction between the parts of machinery.

Friction is however very necessary and desirable in many cases. We would not be able to walk if there was no friction between our feet and ground. Any one walking on a slippery floor experiences this difficulty. If there were no friction we would not be able to drive nails into wood. In fact a nail would come out

of the hole the more we tried to drive it in. The screws would unwind themselves in the absence of friction. The belt which is used to transfer power from an engine to the machinery can do its work because of the friction between the surface of the belt and the wheels of the machine which it rotates."

(i) A lightning flash is a stream of electrons from earth to cloud, from cloud to earth or from one cloud to another.

(j) The earth is considered as a magnet because it behaves like a big magnet. A magnetised needle suspended to swing will set itself pointing to the Earth's Magnetic North and South poles at an angle to the horizon. The two magnetic poles of the earth, South and North poles, are located in Canada and in Antarctica, respectively, which are hundreds of miles away from the true north and south poles of the earth. It has been found by scientific expeditions that at a certain place in Canada, the north pole of a magnetic compass points directly downwards, and similarly the south magnetic pole of a compass points downwards in the Antarctic region.

(h) Because it is more economical to transmit electricity at high voltage, and low amperage as less electrical energy is lost.

Q. 42. (a) Name two chemicals used in purifying water and state how each acts.

(b) What is meant by the carbon and nitrogen cycles? State their importance to plants and animals.

(c) What is "fixation of nitrogen"? How is this accomplished by plants?

(d) What is the relationship between watts, volts and amperes

(e) State briefly what energy transformation takes place in (a) a generator (b) a motor.

(f) Why are high tension wires made of copper or aluminium?

(g) What is the meaning of the number of kilowatt hours stated on a bill of electricity?

(h) Why do sounds travel faster through warm air than through cold air?

(i) Why do sounds travel faster through steel than through water?

(j) How can noise in an auditorium be reduced?

Ans. (a) Alum and chlorine are two chemicals used to aid in purifying water.

If alum is mixed thoroughly with a small amount of water and this mixture is poured slowly into the water, it will form a jelly like mass, which settles down slowly and will carry down a great amount of finely suspended matter with it. Thus the suspended impurities are removed from the mass of water.

In the case of chlorine, about four pounds of chlorine gas is added to each million gallons of water. This kills germs and other harmful organism in the water.

(b) Carbon dioxide of which carbon is a part is almost always present in the atmosphere, most specially in and around cities and habitations, where it gets into the air, either by the burning of coal or from decaying matter. This carbon dioxide is taken in by a leaf bud and is used in the process of photosynthesis to make starch. The starch containing the carbon atoms becomes a part of the plant stem or root, which is later used by man and animals for their food. In men and animals the carbon particle becomes part of some tissue which in time becomes oxidised to produce energy.

The resulting carbon dioxide given out through the breath again goes out in to the atmosphere and the cycle thus goes on.

Similarly nitrogen is used up by plants, either by means of some nitrogen compound such as sodium nitrate, or by the fixation of nitrogen by plant bacteria in the nodules of the roots of plants called the *legumes*. This nitrogen is thus taken up by the plants through their roots to build up their bodies. The plants are eaten by men and animals and their refuse like urea etc. goes again to the soil and the cycle is thus completed.

(c) By the fixation of nitrogen is meant the changing of nitrogen from the free to the combined state. Certain plants called legumes have peculiar lumps or nodules on their roots. These plants include peas, clover, alfalfa and beans. Colonies of bacteria, residing in the nodules, manufacture nitrates, which contain nitrogen from the air where this element exists in the free state. This is the fixation of nitrogen. These nitrates are used by the plants as part of their food.

(d) A watt is the unit of electrical power. It is the power available in a line where one ampere of current is flowing under a pressure of one volt.

This may be expressed thus

$$\text{watts} = \text{amperes} \times \text{volts}$$

or

$$W = Av.$$

(e) In the motor, electric current is fed into the armature and the push-pull effect on its poles makes it turn. In the generator, the armature is mechanically turned to cut lines of force in a magnetic field and electricity flows from the armature coil. The

motor transforms electrical energy to mechanical energy; the generator transforms mechanical energy to electrical energy.

(f) This is because copper or aluminium wires do not easily melt even though the voltage is very high, while they are very good conductors of electricity.

(g) The bill shows the kilowatts of electricity used between the time the last reading of the kilowatt-hour meter was taken and the second reading taken between the two intervals.

(h) Sound travels faster in thicker medium than through thinner medium. Cold air is thicker than the hot air hence sound travels faster through colder air than through hotter air.

(i) This is because sound travels faster in solids than in liquids. It travels faster in a medium whose molecules are knit closer than that in which it is not so. In solids the molecules are closer than those in liquids, hence sound travels faster in steel than through water.

(j) In an auditorium in which noise is sought to be reduced, walls and ceilings may be covered with thin sheets of fibre which have small holes of different depth drilled into the surface. When sound waves enter the holes, enough sound energy is absorbed to soften the noise. The shape of the sound waves striking the treated surfaces is changed and echoing is muffled.

Q. 43. What is :—

(a) A hand grenade (b) The Plimsoll Line (c) A Bren Gun (d) The Blue Peter (e) Yellow Flag (f) A dug out (g) Boomerang (h) Riband.

Ans. (a) A sort of hand bomb, much used during the first World War in trench warfare; had a limited range. It is a hollow ball of iron charged with an explosive and provided with a fuse. When thrown from the parapet of a trench, the fuse was soon consumed and the charge exploded while the metal ball bursts into fragments.

(b) A load line or a circle with a horizontal line through the centre painted on the side of every ship to indicate to what depth she may be loaded so as not to roll or sink.

(c) Standard light machine-gun of the British Army, gas operated and air cooled, weighs about 23 lbs. and fires at the rate of 500 rounds per minute.

(d) Blue flag with a white square in its centre flown by a ship when about to sail.

(e) The Yellow flag is flown by a ship when its crew is suffering from some contagious or infectious diseases.

(f) A trench dug out of earth to serve as a shelter from enemy shells and to serve as a place of concealment from where attack the enemy.

(g) A deadly missile made of hard curved wood used by the Australians as a weapon of war. It is so constructed that if it misses its mark, it returns with a swoop and falls in the rear of the thrower.

(h) Dark blue ribbon awarded to vessels making the fastest crossing of the Atlantic in both east and west directions.

Q. 44. Which of the following diseases are infection carriers? :—consumption, rheumatism, diphtheria, neuralgia, gout, syphilis, bronchitis, lumbago and scarlet fever.

Ans. Consumption, diphtheria, syphilis, scarlet fever.

Q. 45. Which gases are to be found in the atmosphere?

Ans. Oxygen, nitrogen, argon, carbon dioxide, helium, neon, Xenon, krypton.

Q. 46. Which parts of the body are affected by the following diseases?

Appendicitis, Syphilis, Pneumonia, Consumption.

Ans. Appendicitis, the appendix in the Alimentary canal; Syphilis, the sexual organs; Pneumonia and consumption, the lungs.

Q. 47. Name the diseases which take heaviest toll of life in India.

Ans. Malaria; Typhoid; Cholera; Plague; Pneumonia and Tuberculosis.

Q. 48. Which travels faster? :—

(a) The fastest aeroplane or the fastest bullet.

(b) Light waves or wireless waves.

(c) A message by telephone or one by wireless.

(d) Mars or the Earth.

(e) Ultra violet rays or infra red rays.

Ans. (a) A bullet.

(b) Same speed.

(c) By wireless (186,000 miles per second—the speed of light—as against a few miles per second depending on the length of the wire, etc.).

(d) The earth (18.52 miles per sec.), Mars travels at only 15 miles per second.

(e) Same velocity.

Q. 49. (A) What is the difference between organic and inorganic chemistry ?

(B) How many teeth are there in (a) a child under five ; (b) a full grown man ; (c) a horse ; (d) a dog ; (e) a cat ?

Ans. (A) Organic chemistry is that branch of chemistry which is devoted to the study of all the carbon compounds which are in existence.

Inorganic chemistry excludes the study of the carbon compounds and deals mainly with the preparation and properties of the rest of the various elements and their compounds.

(B) 20 milk teeth (b) 32 (c) 40 (d) 42 (e) 30.

Q. 50. What is the difference between a bull, a cow, an ox, a steer, a heifer, a bullock and a calf ?

Ans. *Bull* is a fully grown male ; *Cow* is a fully grown female ; *Ox* is a fully grown castrated male (i.e., the male whose reproductive organ has been made impotent). It is called a *Steer* or *bullock* until it is three years old ; *Heifer* is a young cow up to the birth of its second calf, *calf* is a young of either sex.

Q. 51. Which of the following burn with a flame ? :—

Chalk, phosphorus, magnesium, oil of vitriol, helium, carbon, methane, hydrogen, nitrogen, oxygen.

Ans. Magnesium, carbon, methane, hydrogen.

Q. 52. (a) How old is the earth ? How has its age been calculated ?

(b) What are dinosaurs ? What have made the dinosaurs disappear from the earth ?

(c) How do plants and animals help to change the earth's surface ?

(d) How could you tell whether soil in a certain area was deposited by a glacier ?

(e) Which do you think would cost more, a 14 carat gold ring or an 18 carat gold ring ? Why ?

(f) What is the difference between brass and bronze ?

(g) Which class of rocks is the oldest ?

(h) Explain why large gasoline storage tanks are painted light colour.

(i) What are the most essential steps between the 'snapping' of a picture and the production of the printed picture?

(j) Fish in a bowl of water appears larger in size than it really is. Why?

(k) What is the (a) likeness (b) difference between the human eye and a camera?

Ans. (a) The age of the earth has been estimated at two billion years.

The method adopted by scientists depends on the disintegration of Uranium first into radium, and of radium into lead. "Uranium very slowly disintegrates to form radium, and radium in turn slowly disintegrates to form lead. Scientists have calculated the amount of time required for these changes to take place. In the oldest rocks the three elements are found together. Knowing how long it must take for the lead to form from the Uranium, scientists estimate the age of the earth. According to their estimates the oldest rocks are all believed to be about two billion years old." So the earth is two billion years old.

(b) Dinosaurs is the term used for a number of extinct reptiles belonging to the Mesozoic age. They were of two distinct types (1) carnivorous biped types and herbivorous quadrupeds (2) those which had "bird hips" and resembled the ostrich. They were the largest land animals that ever lived.

Many causes may have been responsible for their extinction. (1) Their eggs may have been preyed upon by the mammals which were becoming abundant by the end of the cretaceous period. (2) They may have been wiped out by disease. (3) The extinction may have been caused by the geological changes which occurred at the end of the Mesozoic era and which were accompanied by marked climatic changes of their environment (specially with respect to their food etc.). These are likely to have upset the whole balance of the lives of the dinosaurs which, being too specialized to adapt themselves to the new conditions, rapidly became extinct.

(c) Animals like ground hogs, moles, ants, worms and other animals live and move about in the ground and turn over the soil. All these help to enrich the soil by bringing it fresh from deep under the ground.

(d) Glacial deposits are unassorted; great boulders, stones, pebbles, sand and clay all mixed together. Moreover, glaciers often leave rocks marked with scratches made by pebbles and sand that were held firmly in the frozen ice. The stones and pebbles they leave are not as round and smooth as those deposited by a river.

Unlike those of a glacier, sediment deposited by a river is assorted. Hence it is very easy to tell if a soil was deposited by a glacier or some other agency like a river.

(e) The carat implies a twenty-fourth part; chemically pure gold is 24-carat. Thus a ring which has 14 carat gold means that it has a mixture of 14 parts gold and 10 parts alloy; while an 18 carat gold ring has 18 parts gold and 6 parts alloy. Obviously the 18 carat gold ring has more gold than the 14 carat gold ring and is costlier than the other.

(f) Brass is an alloy of copper and zinc, while bronze is an alloy of copper and tin.

(g) Igneous rocks are the oldest and most primitive rocks.

(h) It is to be noted that dark-coloured surfaces absorb radiant heat faster than light-coloured surfaces of the same material. Now since gasoline, which is another name for petroleum motor spirit, is a highly inflammable liquid, the storage tanks containing it are painted light colour so that their surface may absorb as little radiant heat as it would otherwise do if the painting was done in dark colours, and thus heating of the storage tank is avoided as far as possible.

(i) "As a picture is taken, the image flashed upon the film produces nothing visible. The light rays that enter the camera from the object are not all of the same strength or intensity. Brighter portions of the object reflect more strongly than darker portions. As these rays strike the sensitive film they produce very tiny changes in the silver compound present on the film.

When the film is placed in a solution, called the developer, more complete chemical action takes place at every point where the ray of light has struck the film. As the light was of unequal strength at different image points, the result is a series of *light* and *dark* areas on the film which resemble areas on the object in appearance, but which are the reverse of the shading in the object. This is the *negative*. Light is passed through the negative to photographic paper. When the paper is developed and printed, the desired image is obtained."

(j) The liquid in the bowl acts as a lens to produce magnification.

(k) (i) Both have a lens, diaphragm, film and focussing apparatus. (ii) The lens material is different, the eye lens in the human eye is focussed by the action of muscles.

Q. 53. Explain how motion pictures make use of persistence of vision.

Ans. (a) An image on the retina does not fade out the instant the object is removed from the eye. The vision

(f) Because it is a warm blooded mammal and suckles its young ones.

(g) A stone found near Rosetta in Egypt on the Nile which had hieroglyphic characters inscribed on it with their translation in Demotic and Greek which have enabled archaeologists to interpret the hieroglyphics (old Egyptian writings in picture signs) of the old Egyptians.

(h) An imaginary stone sought after by alchemists of old as it was supposed to turn baser metals into gold. The fruitless search for a stone, however, led to many important chemical discoveries.

(i) Etching is a form of engraving. Pictures are produced from copper or zinc plates by a process in which the picture has been "etched" or bitten in by means of some corrosive acid or chemical.

The metal plate is first coated with a wax amalgam and the design is drawn on the soft ground with an etching needle. The whole thing is then immersed into an acid bath and the acid bites into the exposed portion of the plate. Finally the wax is removed and prints taken as in ordinary printing.

(j) The frigate bird.

(k) The method of surface printing based on the principle that grease and water repel each other. The drawing is made with greasy ink on an absorbent stone by transfer from an inky design on paper, or by engraving the design on a prepared stone and the drawing is then printed. The water parts will repel the ink, while the drawing (or greasy parts) will attract it. The impressions will be quite clear. Students should note that Urdu books are printed on lithograph machines based on this process.

Q. 56. (a) Explain why friction in a machine is greater when the machine is being started than soon after it is started.

(b) When do we have useful friction, and when is it undesirable?

(c) What is streamlining?

(d) What are a turbojet; a stationary engine, a reaction engine?

(e) Why do most engines have flywheels?

(f) How does an engine piston which moves in a straight line cause rotary motion?

(g) Why do screws hold two pieces of wood more firmly than nails?

(h) What is the difference between (a) motor and dynamo (b) alternating and direct current?

Ans. (a) This is because sliding friction requires greater energy to overcome than rolling friction. When a machine is started, sliding friction is at work and soon after it has started working rolling friction comes into play.

(b) It is so hard to walk on an icy sidewalk, because it is slippery. Want of friction thus causes so much inconvenience in this case, but if you want to go fast down a hill on your sledge, you look for a very smooth slope, where there is very little friction to slow you down. Thus in this latter example, friction is a positive hinderance in movement. Thus somewhere friction is a hinderance and somewhere it is a help.

(c) When an airplane is flying it has to overcome friction of the air. It has to be built long and narrow with a blunt end in front to overcome this resistance which is less than if the front were broad. This type of building is called streamlining. Boats designed to travel rapidly through water are built this way to reduce the friction and resistance of water.

(d) A combination of turbine and jet engine is called a *turbojet*. It is an engine which has a propeller connected with a turbine and gets forward thrust by hot gases roaring from the exhaust. When a steam engine is fixed it is called a stationery engine. Such an engine is bolted to a concrete base. A reaction engine is a kind of engine used in jet airplanes. Jet-propelled planes require no propellers. They dart up at such high speed that they are out of sight while we still hear their shrill whine. The engine in the jet plane is called a *reaction engine*.

(e) (1) The flywheel serves as a steadying turning body in the rotatory motion. (2) It is also a way of storing kinetic energy. A heavy flywheel rotating rapidly has much kinetic energy, and so if an engine is called on for a sudden brief supply of extra power, the flywheel by slowing down can furnish it.

Also the inertia of the flywheel keeps the engine going when steam cannot push.

(f) When a piston rod moving in a straight line is connected at its end with a *connecting rod turn crank*, which in its turn is connected with a crank flywheel, the straight motion of the piston is converted into rotatory motion.

(g) Because of the greater surface of friction by the round turns of the screw.

(h) (a) A motor uses electricity to produce mechanical energy, a dynamo converts mechanical energy into electricity.

(b) Direct current flows in one direction only ; alternating current reverses itself many times per second.

Q. 57. Complete the following statement by selecting the proper word or words :—

(a) Ultra-violet rays are obtained from (mercury vapour) (sodium vapour).

(b) The device that converts electrical energy into mechanical energy is a (motor) (dynamo) (transformer).

(c) Water when changed to steam occupies a volume—times as great.

(d) In a steam engine, the admission and expulsion of steam is controlled by the—

(e) For an ascent of 600 ft. vertically the fall in temperature is about (1°F), (2°F), (6°F).

(f) The moisture held by cold saturated air is (more than), (less than) (the same as) as that held by warm saturated air.

Ans. (a) Ultra-violet rays are obtained from mercury vapour.

(b) The device that converts electrical energy into mechanical energy is a motor.

(c) Water when changed to steam occupies a volume 1700 times as great.

(d) In a steam engine the admission and expulsion of steam is controlled by the side-valve.

(e) For an ascent of 600 feet vertically the fall in temperature is 1 degree F.

(f) The moisture held by cold saturated air is less than that held by warm saturated air.

Q. 58. (a) What are German silver and brass made of ?

(b) What are the uses of (i) asbestos (ii) cinchona (iii) aluminium (iv) jute (v) mahogany (vi) teak and (vii) sandalwood ?

Ans. (a) **German Silver :** It is an alloy of copper, nickle and zinc.

Brass : It is an alloy of copper and zinc.

(b) **Asbestos :** For making fire-proof material and for motor-car brakes and clutches.

Cinchona : Quinine and cinchonidite are extracted from it.

Aluminium : For domestic cooking utensils, motor-car parts, electric cables and aeroplanes. Also for alloys in which lightness and strength is required.

Jute : For canvas, cordage, tarpaulin, sacks and backing for carpets, upholstery, webbing, twine, etc. etc.

Mahogany : Furniture.

Teak : Shipbuilding, furniture and ornamental work.

Sandalwood : Its oil is used as a perfume ; also for ornamental boxes.

Q. 59. What are the following instruments used for ? :—

(a) **Audiophone** (b) **Aneroid** (c) **Audiometer** (d) **Chronometer** (e) **Range finder** (f) **Clinometer** (g) **Sextant** (h) **Dictaphone** (i) **Hydrometer** (j) **Microscope** (k) **Spectroscope** (l) **Stethoscope**.

Ans. (a) Audiophone : Instrument for improving imperfect sense of hearing.

(b) **Aneroid :** A barometer consisting of small watch shaped air tight and air exhausted shallow metal box, with internal spring work whose movements are magnified by a series of levers in the spring work, so as to cause the rotation of a pointer pivoted at the centre of a circular calibrated scale. These movements are caused by the pressure of the surrounding air. The instrument measures the pressure of the atmosphere by the movements of the pointer.

(c) **Audiometer :** Instrument for testing hearing power or for measuring intensity of sounds.

(d) **Chronometer :** Instrument, much like a watch in size and shape, for measuring time with particular exactitude.

(e) **Range finder :** An optical instrument for finding the distance of a target from the firing point.

(f) **Clinometer :** An instrument for the measurement of vertical angles, largely employed in ordinary survey to determine the position of contour lines.

(g) **Sextant :** An instrument for measuring Sun's altitude at noon and also of other celestial bodies and the angular distance between objects. Much used in navigation and land surveying.

(h) **Dictaphone :** An apparatus into which letters etc. can be dictated. It works on the same principle as a gramophone. The words spoken through a mouthpiece are recorded on a revolving wax cylinder and can be reproduced. Much used in big offices in advanced countries, specially by heads of big firms.

(i) **Hydrometer** : Instrument for measuring specific gravity of liquids.

(j) **Microscope** : Instrument with high power of magnification used for observing minute objects.

(k) **Spectroscope** : Instrument for analysing the spectra of rays emitted by luminous bodies.

(l) **Stethoscope** : Optical instrument for representing to the eye as single object in relief, two views of the object taken from slightly different angles.

Q. 60. What are the following ? :—

(a) **Carburettor** (b) **Helicopter** (c) **Periscope** (d) **Hydroscope**
(e) **Galvanometer** (f) **Howitzer** (g) **Dynamo** (h) **Pyrometer** (i) **Calorie** (j) **An ohm**.

Ans. (a) **Carburettor**. An apparatus mixing air with petrol vapour in combustion in motor vehicles.

(b) **Helicopter**. A flying machine rising vertically by means of lifting propellers, revolving horizontally. It can hover, and rise from and alight in a very limited area.

(c) **Periscope**. An optical instrument designed for observation from a concealed position. In essence it is based on the use of two reflecting mirrors in a tube. These tubes have parallel surfaces inclined at an angle of 45° to the tube's axis.

(d) **Hydroscope**. Instrument for observing the bottom of a body of water.

(e) **Galvanometer**. An instrument for measuring current of small magnitude.

(f) **Howitzer**. A type of gun used in war to throw a projectile at high angle. It was much used in the Great War of 1914-18, for demolishing the fortresses of the trench system.

(g) **Dynamo**. A machine converting mechanical energy into electrical energy by rotating coils of copper wire in a magnetic field.

(h) **Pyrometer**. An optical instrument for the measurement and comparison of very high temperatures.

(i) **Calorie**. The unit of quantitative measurement of heat. It is now-a-days used to denote the amount of heat required to raise 1 litre of water through 1°C .

(j) **An Ohm**. In electricity the practical unit of resistance. A circuit's resistance is 1 ohm when a pressure of 1 volt is required to produce a current flow of 1 ampere.

Q. 61. What articles or products are made from ?—

(a) Catgut (b) Copra (c) Coal tar (d) Coir (e) Petroleum.

Ans. (a) Catgut is used for strings of violins and such other instruments ; also for tennis rackets, and by surgeons for putting stitches in wounds. (b) Copra is used for the coconut oil. (c) Coal tar gives a number of valuable products, e.g., light oil, middle oil, heavy oil, anthracine oil, creosote oil, and a number of dyes, drugs, synthetic perfumes and essences etc. (d) Coir is used for ropes and cordages. (e) Petroleum gives a number of products like light and heavy naphtha, petrol, paraffin oil, lubricating oil, vaseline, paraffin wax etc.

Q. 62. Explain briefly the following sciences :—

Cosmogony ; Physiology ; Meteorology ; Photochemistry ; Optics ; Thermodynamics ; Ornithology ; Pathology ; Pharmacology and Gynaecology.

Ans. Cosmogony. The theory of the origin of the universe and its inhabitants.

Physiology. That branch of biology which deals with the functioning of the human body in perfect health.

Meteorology. The science which treats of the phenomenon of the atmosphere as regards weather and climate.

Photochemistry. The study of the chemical effects of radiation, chiefly visible and ultra-violet, and of the direct production of radiation by chemical change.

Optics. The scientific study of the phenomenon of light and vision.

Thermodynamics. The mathematical treatment of the relation of heat to the mechanical and other forms of energy.

Ornithology. The scientific study of birds, their origin, classification, structure and habitat.

Pathology is the branch of biology which deals with abnormalities or diseases in the structure or functioning of the body or mind.

Pharmacology is the branch of medical science which deals with the collecting, preparing, preserving and dispensing of medicines.

Gynaecology is that branch of medicine, which treats of the diseases and affections peculiar to woman and her physical organism.

Q. 63. From what are the following obtained ? :—

Bleaching powder, sulphur, iodine, glue, paper, quinine, sulphuric acid, cement, turpentine.

Ans. *Bleaching powder* is obtained by passing a stream of chlorine over dry slaked lime.

Sulphur is obtained free in nature in volcanic districts, e.g., in Sicily and the states of Texas and Louisiana in U. S. A. ; also as a by-product of coal gas industry and from iron pyrites.

Iodine is obtained from sea weeds, from Chile Saltpeter or from sea water.

Glue is obtained from animal skins, hoofs, bones, fish, offal etc.

Paper is made from bamboo, esparto grass, rags, linen and wood pulp etc..

Quinine is obtained from cinchona alkaloids.

Sulphuric Acid is obtained from sulphur dioxide, which is a compound of sulphur and oxygen.

Cement is obtained from chalk and clay.

Turpentine is extracted from cuts made in the trunks of some trees belonging to the pine family.

Q. 64. What is the normal temperature in Fahrenheit degree of the following ?—

(a) a human being (b) a horse (c) a dog (d) ice (e) boiling of water.

Ans. (a) Human being : 98.5° , (b) Horse : 100° , (c) Dog : 101° , (d) Ice : 32° , (e) Boiling water : 212° .

Q. 65. Which are the fevers that are caused by bacterial infection ?

Ans. Enteric, diphtheria, scarlet fever, erysipelas, smallpox, measles, chickenpox, meningitis, mumps, whooping cough, pneumonia, tuberculosis, venereal diseases, anthrax, cholera etc.

Q. 66. What are the chief distinguishing marks of ? :—

(a) A cobra (b) a python (c) a rattlesnake (d) a Russell's viper (e) a krait (f) coral snake (g) sea snake.

Which of them are poisonous and which are not ?

Ans. Cobra has a hood with the spectacle marking on it. Poisonous.

Python. Enormous size which may be anything between 20 and 30 ft. and a big mouth for swallowing its prey. Not poisonous.

Rattlesnake. Horny flat rings at the tale which rattle as the snake moves. Poisonous.

Russells' viper. Triangular flat head, a short tail, magnificent brown colour and three rows of white spots. The body is fairly thick. Poisonous.

Krait. A krait is easily recognized by 1. the cylindrical tail 2. enlarged medium rows of scales on the back 3. four infralabial scales of which the fourth is the largest. Poisonous.

Coral snake. It is red or reddish brown in colour with the head and neck black. Readily recognizable by the bands on its body. Poisonous.

Sea snake. By its compressed and oarlike tail which is an adaptation for swimming. Poisonous.

Q. 67. (a) Do carbohydrates include foods that contain mostly protein, mineral matter or starch ?

(b) In which part of a flower is pollen produced ?

(c) What is the union of an egg cell with a sperm cell called ?

(d) Does respiration, or digestion or assimilation change insoluble foods into soluble form ?

(e) Name destructive forces that rob soil of its fertility. How can such a soil be made fertile again ?

(f) When vegetable matter decays, what does it become ?

(g) Some men who tune pianos are totally blind. Explain how they are able to do their work successfully.

Ans. (a) They contain mostly starch.

(b) Pollen is produced in the anther of a flower.

(c) It is called fertilization.

(d) By the process of digestion.

(e) Fire, flood, drought, erosion and dust-storms rob the soil of its fertility. Fertility to the soil can be restored by proper agriculture, fertilizers, using improved varieties of seeds, developing disease resisting plants, introduction of special bacteria into soil, maintaining proper water balance through irrigation and drainage etc.

(f) It becomes humus.

(g) This is due to practice and training of the ear. In a piano—which is a stringed instrument—musical notes are produced by striking wires of different lengths and thicknesses. When a person plays a piano he strikes different keys which control small hammers. The small hammer sets in vibration a wire of the correct thickness and length to produce the note desired. An experienced player, even though he be blind, strikes correctly the different keys by constant practice of his hands and ears.

Q. 68. (a) What is the distinction between infection and contagion ?

(b) What is the distinction between vaccination and inoculation ?

(c) What is the distinction between a colt, a stallion and a mare ?

Ans. (a) The communication of disease from one person to another is infection, as for example infection takes place when the germs in the stools of a suffering person who has eased himself in a pond, get into persons who unwarily drink that polluted water. The disease at once attacks its fresh victim. It is contagious when the infection occurs by actual contact between two persons, like many venereal diseases.

(b) Vaccination is distinguished from inoculation by the fact that in vaccination *dead bacteria* of the variety responsible for a disease is injected into the blood stream of a patient suffering from that disease so as to increase his resistance to that disease, whereas in inoculation it is *living germs* of such a disease that are introduced in the blood stream by hypodermic injection on the hypothesis that a mild attack of the disease by the germs prevents his being subsequently liable to the severe attack of that disease. The latter is introduced only as a precaution while the patient is not suffering from that disease.

(c) Colt : The male horse.

Filly : The female horse.

Stallion : The adult horse.

Mare : The adult female horse.

Q. 69. Who are the following ? :—

An alienist, a radiologist, an entomologist, an anthropologist, an epigraphist, dermatologist, morphologist, taxidermist, chiropodist.

Ans. An *alienist* is one who studies mental diseases.

A *radiologist* is a person who studies the application of the X-rays in medicine and surgery to diagnose diseases and deformities of bones and tissues. A radiograph or X-ray photograph of the organ concerned helps him a good deal.

An *entomologist* is a specialist in the scientific study of insects.

An *anthropologist* is one who studies the natural history of man, i.e., as he exists or has existed under different physical and social conditions.

An *epigraphist* is a scientist who studies ancient inscriptions on stones and other durable material.

A *dermatologist* is a specialist in the functions, structure and diseases of the skin.

A *morphologist* is a specialist in the structure of plants and animals.

A *taxidermist* is one who prepares and stuffs the skins of animals for exhibition.

A *chiropodist* is a specialist in the treatment of hands and feet.

Q. 70. For what purpose are the following used ? :—

Platinum ; lead ; tungsten ; chromium ; mercury ; sulphur ; manganese ; copper and bronze.

Ans. *Platinum.* In jewellery as a setting for diamonds and for wedding rings ; in chemistry, as a catalyst ; in dentistry, in scientific instruments ; in electric bulbs etc.

Lead. Waterpipes ; many important alloys like pewter, type for the printing press, in the paint industry, in making shots, and as thick protection sheets in the atomic pile laboratories etc. etc.

Tungsten. Filament for electric bulbs ; also for many steel and aluminium alloys.

Chromium. Mostly for steel plating.

Mercury. In making mirrors, in electrolysis, in physical and chemical apparatus ; its compounds used in medicine as purgatives etc. and as amalgams with other metals.

Sulphur. In the manufacture of sulphuric acid, in safety matches, in pharmacy and in vulcanizing rubber.

Manganese. As a catalyst, and in the manufacture of alloys, specially with steel.

Copper. As one of the important ingredients in alloys, e. g., bronze ; cables ; boilers and even as utensils.

Bronze. Utensils and coins etc.

Q. 71. Write as lucidly and concisely, as you can, the main principles on which the following work :—

(a) The radio

(b) The gramophone

(c) An electric bell

(d) A telephone

(e) Dictaphone

(f) **Electric lamp**

(g) **Turbine**

(h) **Helicopter**

Ans. (a) The Radio. The programme we listen to on the radio reaches us in the form of sound waves. Sound waves are vibrations which travel outwards from their source in all directions and set the surrounding air in motion. Our ears vibrate in sympathy with them and that is why we hear these sounds. But sound waves travel only to short distances, and as this distance increases they go on fading and fading till they are too weak to be heard. It is the work of the radio to carry our sound to long distances into space, so that the sound travels with the speed of light and almost in a second's time it reaches the other corner of the world where one is listening to the programme through his radio.

The apparatus that does this marvel for us is the **microphone** which turns the sound to be broadcast into electric currents that travel outwards into space. It works on the following principle :

If a big coil of wire is made to move in a magnetic field, an electric current flows in the wire. Now this coil of wire which is made to move fast at an extremely high speed is attached to a **diaphragm** which the sound waves (produced by men in the studio room speaking or singing or making any set of sounds for the programme or recorded music of gramophone) cause to vibrate in the same way as our human eardrum.

Currents produced by the microphone in the broadcasting studio are fed by means of a pair of wires to an adjacent room called the control cubicle where they are mixed with currents from other microphones to complete the programme. So the programme that we hear is completed in this control cubicle. This cubicle also contains an apparatus called the amplifier with a volume control. With its aid the volume of sound to be broadcast is regulated. As these currents are very weak they are amplified before they are passed to the central control room.

It is in the control room that all the programmes from different studios are sorted out and regulated. Here they are again amplified before being sent by underground cables to the last room, i.e., the transmitter control room. It is the transmitters which broadcast the programme by means of radio waves to the outside world, and which the radio on the other end receives.

What are these radio waves that carry the sounds of the programme from the transmitters to the place where our radio is situated and how are they produced ?

It should be remembered that when the alternating current

of low vibration or frequency flows in an electric circuit, the current remains confined to the wires through which it passes, but at the same time it also produces an electro-magnetic field surrounding the wires. *If this vibration or frequency of the A. C. current were to be increased a million times per second, the electro-magnetic waves spread out through space.* It is these waves which are called the wireless or radio waves which require no cables or anything to carry them, and which spread out like sound waves or like the ripples on the surface of the water when a stone is thrown into it. These wireless or radio waves set up vibrations in the form of alternating current in the diaphragm of our radio receiver. The diaphragm thus reconverts the radio waves to the original sounds and these are thus heard through the radio receiver.

(b) **The gramophone.** The gramophone is an instrument for reproducing recorded sound especially music, so that one can hear the music in the freshness of the original sound. How this is done may be told in a few words. The orchestra or the singer is housed in a sound proof studio, so that outside sounds should not meddle with the clear recording of the music. The sound of the singer is picked up by microphones which *convert the sound waves to electrical impulses.* The microphone is in fact nothing more than a very sensitive diaphragm which vibrates under the impact of the sound waves of the song of the singer and makes a coil of wire move in a magnetic field. This sets up an electric current in the coil. The electric current is an electrical body of the sound.

These electrical currents from the microphone are directed to the control room for the purpose of balancing them for good record. These impulses are then directed to the head of the stylus or the needle fixed on the recording machine.

The recording machine is a box which has a round table rotated by a motor in it. On this round table is a disc of a soft and firm material usually shellac covered with wax. The electro-magnetically operated needle ploughs a shallow groove (about 100 to an inch) in the wax disc and thus records the original sound of the song. Now from this disc impressions are taken and serve as moulds for manufacturing the record.

(c) **Electric Bell.** The main principle on which the electric bell works is the make and break of the armature in the magnetic circuit created by the current from a Leclanche cell.

The structure of the Electric Bell is this : Two coils of wire are wound on a soft iron frame. Facing the end of the iron frame is the armature, which is only a strip of soft iron ; one end of which is fixed to a flexible steel band. Near the free end of the armature is the bell hammer. Attached to the armature is a contact plate, which touches an adjustable contact pillar. A wire

from the end of one of the coils is attached to the fixed part of the armature, while the wire from the same end of the other coil leads to a terminal. Now the two remaining wires on the other ends of the two coils are joined together to form a single coil of two opposite wound wires.

When these wires are attached to the dry Leclanche cell, current at once flows through the wire coils which magnetize the iron frames on which they are wound. The magnetized frame at once attracts the soft iron armature which in its turn pulls the contact plate away from the pillar, causing the hammer to strike the bell. But now the circuit has been broken between the plate and the pillar and the current ceases to flow between them. The armature is now free to spring back to its original position and thus allows the contact plate to reconnect with the pillar. The result is that the circuit gets completed once more and again the momentary magnetisation is repeated with the result that the hammer strikes the bell once again. The rapidity with which this make and break operation takes place results in the equally rapid striking of the hammer on the dome of the bell and its continuous ringing.

(d) **The telephone.** The telephone consists of a receiver and transmitter, with a coil of wires leading to and connected with a line, which has an automatic dialing device, where the wanted line of the person to be called is joined. The connection is thus completed.

The transmitter is a microphone with an electrically conducting aluminium diaphragm, behind which is a hollow box loosely packed with granules of carbon. Now when the telephone is raised an electric current flows in both the transmitter and the receiver. When a person on lifting the telephone speaks into its microphone, the diaphragm of the microphone vibrates in unison with the speaker's voice. Vibrations of the diaphragm vary with the degree of compression, causing the resistance of the granules to fluctuate. Similarly fluctuating currents are set up and each one of the electrical reproduction of the sound waves thus causes a pulse of current to pass to the transmission lines. In the telephone receiver there are two short iron rods mounted on the ends of a U shaped magnet. Wound on the rods are coils of wire which are connected to the transmission lines. When the person on the other side speaks into his telephone, the electric currents that his sound sets up come through the transmitting lines, and the electromagnet pulsates in sympathy with the pulsating currents; and moves the diaphragm of the receiver in sympathy with it; the electric waves are converted into sound waves and are heard through the receiver.

(e) **Dictaphone.** The dictaphone is an electrical machine for recording the spoken words and works on the same principle as the gramophone. It is both a dictating and a transcribing machine.

In the essentials of its make up, it consists of (a) a flexible tube through which the spoken message is conveyed, (b) a revolving wax cylinder for recording, (c) a record reproducer which not only impresses the spoken words on the cylinder, but it also enables the person who is dictating his speech to hear back what he has dictated and (d) with the help of a stop and start button to control the movement of the cylinder allowing it to revolve only when he is speaking.

The stop and start button has a cable wire attached to it. When the speaker wishes to start speaking, he pushes the button and the cylinder starts rotating. When he takes up his thumb the cylinder stops automatically by the disconnection of the wire of the cable with the wire carrying the electric current.

When the speaker begins to dictate into the speaking tube, the diaphragm of mica in the box with which the tube is connected vibrates in response to the air vibrations set up by the sound of the person dictating. In the centre of this diaphragm are attached two jewel points, one of which records the speech and the other reproduces it. When the cylinder starts rotating, the recording jewel point furrows a groove in the wax coated plate. This groove is furrowed exactly in consonance with the pitch of the voice of the speaker. Any speed of dictation is possible. Each cylinder holds over 1060 words. The cylinder is then transferred to the transcribing machine which reproduces the words through a head-phone, when they can be typed out.

(f) **Electric lamp.** The electric lamp works on the principle that when a strong current of electricity passes through a very thin filament of a wire which can conduct electricity, the extreme heat generated on account of the resistance offered by the filament to the passage of electricity at once gets converted to light. This fact is applied in the incandescent filament lamps. The filament is made of a material that conducts electricity and which has also a very high melting point. The most suitable metal is tungsten. To prevent oxidation the filament is enclosed in a glass bulb containing the gas argon mixed with a small quantity of nitrogen.

(g) **Turbine.** The turbine is a device in which steam (having often a temperature as high as 850 degrees Fahrenheit) from a boiler at a great pressure (which sometimes amounts to 1000 lb. per sq. inch) is directed by jets against blades fixed to the outer surface of the drum; the energy of the escaping steam causes the drum, along with its blades to rotate, thus converting the kinetic energy of the steam into work.

A turbine comprises of two parts ; the rotor or moving part, and the stator or fixed part.

The rotating drum or the rotor is fixed on an axle which is composed of steel laminations on which are wound many thousands of wire loops. When the coil is energized from an exter dynamo, it becomes an electromagnet and creates lines of magnetic force. Driven by the turbine, the rotor spins rapidly, with the result that its magnetic field is continuously sweeping across the looped wires. The axle is surrounded by the stator, a steel shell which has copper conductors wound on its inner face. Currents are induced in these conductors and the electricity produced is led away from the power station by the distribution system. This is how electricity is produced by help of a turbine.

(h) **Helicopter.** The Helicopter is a flying machine equipped with one or more lifting propellers which rotate horizontally, and which enable it to make a verticle ascent. It can hover and rise from and alight in a very limited area.

Q 72. What is meant by (a) Ethnology (b) Numismatology (c) Ornithology ?

Ans. *Ethnology* is the science which treats of the physical and mental characteristics, origin and distribution over the globe, of the human race.

Numismatology is the science which deals with the study of coins and medals which throws so much light on the history of the states and authorities which issued them, as the inscriptions often give reliable and useful guidance as to dates and historical events.

Ornithology deals with the scientific study of birds, their origin, classification, structure and habitat.

Q. 73. What are the function in the human body of ?
(a) Arteries (b) veins (c) heart (d) The liver (e) The kidneys
(f) The gall bladder (g) lungs (h) The spinal chord

Ans. (a). Arteries convey blood from the heart to the whole of the body of a living being.

(b) Veins convey impure blood from all parts of the body back to the heart for purification and pumping it back to the body.

(c) The Heart is the pumping station in a living being. It supplies blood to all parts of the body and thus keeps life going. It also refills used blood from the veins and sends it to the lungs to be purified.

(d) Liver controls the supply of nourishment to the tissues (the assimilation of proteins and creation and regulation of the

essential carbohydrates), elimination of wastes of metabolism and purification of the blood.

(e) *Kidneys* excrete the waste products obtained from the blood by the secretive cells. Thus urea which contains nitrogenous products is discharged by the kidneys. The kidneys are therefore the channels for throwing out the nitrogenous waste of the body.

(f) The *gall bladder* acts as a reservoir for the bile secreted by the liver. It also concentrates the bile, which helps so much in digestion.

(g) The *lungs* perform the function of respiration. They remove the carbon dioxide from the blood and replace it with oxygen, and thus purify the blood.

(h) The *Spinal cord*, along with its nerves, controls the life processes, such as digestion, respiration and blood circulation etc.

Q. 74. (a) What is the source of the tremendous energy of the sun? What part of it does the earth get?

(b) What is the theory of the origin of our earth?

(c) Milk is our most dangerous valuable liquid food, why?

(d) Why does cooling foods help to preserve them? State any method used to cool food.

(e) What are one-celled animals called?

(f) What is the unit of electric work?

(g) Why is milk considered a perfect food?

(h) "Leaves stand between man and death." Explain this statement.

Ans. (a) (i) It is thought to be the transformation of hydrogen and other elements in the sun by constant nuclear fission of the atoms of these elements that releases energy (ii) about $\frac{1}{2,000,000,000}$

(b) There are two theories about the origin of the earth. One is the Nebular Theory; the other is the Planetesimal Theory.

"According to the Nebular theory it is thought that many millions of years ago there was a huge incandescent mass of vapour that swirled and rotated in space. In course of time, it began to cool and contract. The swirling motion increased and from time to time large quantities of gaseous matter broke away from the main mass of highly heated vapour. Each portion of gaseous matter continued to rotate as it cooled and finally became a planet. Nine times in all did this take place and in this way the nine known planets were formed. The earth is one of these planets formed in this way. The other theory is the planetesimal theory. According

- (f) *Ureter*—In the urinary organ
- (g) *Atlas*—Neck
- (h) *Diaphragm*—In the chest just above the stomach
- (i) *Oesophagus*—Upper part of the stomach
- (j) *Sternum*—Breast
- (k) *Prostate gland*—Abdomen
- (l) *Pneumonia*—Lungs.

Q. 78. State in as non-technical a language as possible the description and working or function of your

- (a) heart (b) liver (c) kidney (d) lungs.

Ans. (a) *Heart*. Our heart is a muscular organ situated in our chest and supplies blood to all parts of the body. It is a hollow pear-shaped body, containing two pairs of chambers divided by a muscular wall. The upper smaller chambers are called auricles and communicate with the lower bigger chambers called the ventricles through valves which prevent blood from coming back to the auricles.

The right auricle receives the blood returned from the body through a vein called the *vena cava superior*. It comes from the head, arms and chest and another vein called the *vena cava inferior* comes from the legs and abdomen. This blood is passed on into the right ventricle by the contracting motion of the auricles. The left ventricle pumps purified blood into the aorta—the main artery through which the whole of the body except the lungs is supplied.

Thus used blood comes through veins to the heart and purified blood goes by the arteries to the whole of the body.

The work of purification of the blood is done by the lungs. It is to be noted that the used blood that the right ventricle receives is pumped to the lungs from the right ventricle through the pulmonary veins and the aerated blood is sent by the lungs to the left auricle. This purified blood is sent to the left ventricle which sends it to the body through the aorta.

The circulation is thus complete this way :

- (1) Impure blood received from the body sent to the right auricle.
- (2) Impure blood forced by right auricle to right ventricle.
- (3) Impure blood sent for purification by right ventricle to lungs.
- (4) Purified blood sent by lungs to left auricle.
- (5) Purified blood sent by left auricle into left ventricle.
- (6) Purified blood sent by left ventricle through the aorta to the body.

(b) *Liver*. The liver is a reddish-brown, soft and smooth organ fitting into the upper right hand side of the abdomen just below the diaphragm.

It is divided by fissures into five lobes. Its main function is to separate impurities from the venous blood and to manufacture bile. It is a reservoir for glycogen and in a general way helps in the nourishment of tissues of the body.

(c) *Kidneys*. They are two reddish-brown, bean-shaped organs situated in the lumbar region of the abdominal cavity, one on each side of the spine. They consist of a system of very fine tubes lined with special cells which filter the urea, urine acid, excess salts or sugar and water from the blood brought through the capillary veins. The urine so formed is passed on by the uretra to the bladder, which discharges it outside through the reproductive organ.

(d) *Lungs*. Lungs are the organs of respiration. They are a pair of spongy bodies situated in the chest. When air is inhaled, it reaches them through the larynx, and is passed on to the bronchial tubes of the lungs. These fine tubes are surrounded by capillary veins bringing impure blood from the heart. The carbon dioxide of the blood is removed and is replaced by the oxygen of the air that is inhaled and thus the blood is sent back purified and enriched with oxygen.

Q. 79. Which is heavier—

- (a) A cubic foot of iron or a cubic foot of mercury
- (b) A cubic foot of water or cubic foot of ice
- (c) A man or the same amount of water
- (d) A dog or the same amount of water
- (e) A pound avoirdupois or a kilogram ?

Ans. (a) Mercury (b) Water (c) Man (d) Water (e) Kilogram.

Q. 80. What do you mean by the following ?

- (a) Lock Jaw (b) Lock Hospital (c) Lock-out (d) Lock-stitch
- (e) Lock-age (f) Yale-lock.

Ans. *Lock Jaw*. A contraction of the muscles of the jaw by which its motion is suspended.

Lock Hospital. An hospital for the treatment of venereal diseases.

Lock-Out. The refusal of an employer to admit his employees within the works as a means of coercion.

Lock Stitch. A stitch formed by the locking of two threads together.

thermore led to the remarkable conclusion that light rays are "bent" when they come within the field of influence of a star or other massive body.

The Theory has been tested in many ways, specially during the eclipse of the sun and results have proved conclusively in its favour.

Q. 82. What is the difference between :—

(a) a mouse and a mole (b) a tiger and a lion (c) a whale and a shark (d) an earthworm and a snake (e) a goat and a sheep.

Ans. (a) Both the mouse and mole are allied animals, but the mole has a much softer fur, comparatively smaller eyes, much stronger and tenacious build, and is much more destructive to buildings than the weaker mouse, as the mole digs deep in the ground and throws up much bigger heaps of mounds.

(b) The lion is at once distinguished from the tiger in having a shaggy mane and a tuft on the end of the tail. It is much bigger in size than the tiger. The lion is generally tawny yellow in colour, while the fur of the tiger is generally reddish fawn with black transverse stripes and white under parts.

(c) The shark is a species of a fish, while a whale is a warm blooded mammal which suckles its young ones. Whales rise every few minutes to the surface to breathe, and to expel the warm air with a whistling sound called "blowing." The shark never feels this necessity.

(d) The earthworm is a harmless worm with no eyes, no tentacles, no teeth. The snake has eyes, many of its species have teeth and venomous fangs. The earthworm swallows the earth as it burrows and casts it up again, thus breaking, ploughing and ventilating the earth. The snake does no such thing.

(e) Both the goat and the sheep are allied animals but the goat is easily recognized from the sheep in having larger udders, less thick and shorter hair and in being usually bearded. The horns of the sheep are much thicker and it has much more flesh in proportion to its size. Some sheep like those of N.W.F.P. of Pakistan have very thick fleshy tail, which the spare goat never has.

Q. 83. What do you understand by —

(1) Air-conditioning (2) a U-Boat (3) Television (4) Hibernation (5) Hybrid (6) Vacuum cleaning (7) Air Pocket (8) Aileron (9) Glider ?

Ans. 1. Air-conditioning. The process whereby atmospheric air is cleaned and brought to a suitable condition of temperature and humidity, prior to admission to buildings, factories, cinemas, film laboratories, exchanges, studios, etc. One method

of adjustment is washing the air with water refrigerated to the desired dew point and then heating it to the required temperature.

2. U-Boat. The term refers to the German submarines and were so called because the letter U was prefixed to their number. The boats were extensively used in World War I.

3. Television. The electrical transmission of visual scenes and images by wire or radio, in such rapid succession as to produce, in the observer at the receiving end, the illusion of being able to witness events as they occur at the transmitting end.

4. Hibernation. The state of torpor in which many animals pass the winter, owing usually to the failure of food supply. Thus the frog, the bat, dormouse, badger, the hedgehog and many types of reptiles go to the state of hibernation during winter.

5. Hybrid. An animal or plant produced from two different species. The typical example of a hybrid is a mule born of the crossing between a stallion and a female donkey.

6. Vacuum cleaning. Removing dirt and dust from floor surfaces, carpets etc. by an apparatus called the vacuum cleaner, and transferring it to a suitable container. In this system a rotating brush is brought to bear on the surface of the carpet, agitating its pile and causing the dust to rise. This action takes place through a covered chamber through which a continuous current of air is drawn. The rising current is removed by suction into a vacuum and carried into a bag of closely woven fabric. Here the dust is retained while the spent air is allowed to escape through the fine meshes of the fabric.

7. Air pocket. This is an aerial disturbance caused by vacuum space, among high hills and over valleys, making it dangerous for flying.

8. Aileron. Ailerons are adjustable flaps hinged to the outer trailing edge of the wing of an aeroplane serving the purpose of lateral control of the craft.

9. Glider. A heavier than air craft without propellor or engine, which floats in the air by means of ascending currents of air. (These were extensively used by the Germans in Crete and by the Allies in Arnhem.)

Q. 84. Which insects spread :—

Malaria, Bubonic plague, Sleeping sickness, Cholera, Kala Azar.

Ans. Malaria. Anopheles and gnats.

Bubonic plague. Rat fleas.

Sleeping sickness. Tse-Tse fly.

Cholera. A microbe called *cholera spirillum* or *Koch bacillus*

This was succeeded by *Eusthenopteron*, a lobe-finned fish of the period called the Devonian period. It represented a step forward to life on land. The nasal cavities deepened and opened into buccal cavity. Both gills and lungs were present. Its face was a "bony mask" that was pierced by holes for mouth, eyes and nostrils. The whole set-up had for its object capture of fish; robbing and getting away with the stolen goods and crawling up on the shore to avoid pursuit.

The earliest amphibians mark the next stage. *Eogyrinus* that flourished in a later period, called the lower Carboniferous period, was a swamp dwelling form. It passed its earlier stages in water just like tadpoles or the frog. The fins became modified into limbs.

Next came the early reptile who took an immense step forward by learning to lay eggs on land. The nostrils came closer together. The rest of the body organization retained much of the amphibian traits.

The dawn of lower mammals was foreshadowed by the reptile called the *Cynognathus* in which the eyes began to look forward and the mouth started shortening at the sides. It was a mammal like reptile that fed on small insects.

The next stage was a reptile like mammal—a sort of twilight between reptile and mammal. It is represented at the present time by the common opossum, a "living fossil." It is a survival of the past, a relic that indicates what an archaic form the early mammal must have been. The head is produced into a muzzle, the eyes look more in front. An external ear pinna has appeared.

Another recent archaic mammal, the lemur, again a relic of the past, represents the mammalian stock that gave rise to the Primates. It has a fox like face but in general anatomy foreshadowed a monkey.

The old world monkeys represent a stock from which the monkeys, apes and men descended. The muzzle start shortening, eyes fully look forward and the entire body foreshadows man.

The Anthropoid apes like gibbon, chimpanzee, gorilla, orangutan are most human. The Australian bushman is a relic of an early human race.

Each of these marked changes led to the erect posture of man. The earliest forms lived in water and swam by undulating movements of the body, using the fins as rudders and balances. The swamp dwelling, air breathing fishes modified the fins into paddles and finally into limbs. Then they crawled out of the swamps. They learned to raise the belly off the ground and to run about in search of food or to escape enemies. Next they began to crawl up tree stems and became expert climbers. Some of them

gripped the branches and began to swing from one branch to another. A few of these tree swingers jumped down on the ground and began to run semi-erect. Stones were picked up and used in offence and defence. Man was born."

Q. 89. What principal contribution to a man's health do the following make :—

(a) Carbohydrates (b) Minerals (c) Vitamins (d) Fats (e) Proteins.

Ans. (a) **Carbohydrates** are important in the life of man as structural elements and in maintaining functional activity. They are our chief foodstuffs on which we live. They are most important for muscular work as their sugar and starch supply the energy for work to the body.

(b) **Minerals.** They are essential to health. The composition of the blood, bones, teeth and the working of the glandular system depends upon them.

(c) **Vitamins.** They are a necessity to the right functioning of human organism. If they are absent or are present in insufficient quantities such diseases as rickets, beri beri, scurvy, pellagra would overtake a man.

(d) **Fats** are the source of heat and energy to man. Lean, and emaciated looking people are so because they deprive themselves of fats. They are often very lethargic.

(e) **Proteins.** They are the nitrogenous food most essential for body building. It is by them that the tissues used up by the output of human energy (mental or body) are repaired.

Q. 90. Mention at least three or four articles of food each.

(1) Containing Vitamin A.

(2) „ Vitamin B.

(3) „ Vitamin C.

(4) „ Vitamin D.

Ans. Vitamin A. Butter, milk, eggs, cod liver oil.

Vitamin B. Green vegetables, tomatoes, yeast, peas, beans, cereals, nuts, etc.

Vitamin C. Lemons, oranges, tomatoes, limes and green vegetables.

Vitamin D. Fatty foods, fish liver oil.

Q. 91. (a) What is a freezing mixture? What is its approximate temperature?

(b) What is the difference between 'welding' and soldering?

(d) How is it that though the air around us exerts a pressure of about ten tons on our bodies it does not crush us ?

(e) What will happen to the water system of a town if its reservoir of water were taken about a thousand feet higher than the previous one ?

Ans. (a) This is because, according to the laws of gravity, the attraction of the earth increases as its centre is approached. The earth is flattened at the poles and so the ball at, say North Pole, would be nearer the centre of the earth than it would be at the equator, consequently the earth would pull it harder at the poles and it would weigh more.

(b) This occurs when the force impelling the water outward is equal to the force of gravity pulling it downwards.

(c) This can be done with the help of a centrifugal dryer. The clothes are placed in a perforated metal basket which revolves about 1200 times a minute. The clothes are held by the baskets; the water is hot. It flies out sideways. The force on the water is about 750 times its weight, so just after about ten or twelve minutes of this spinning, the clothes, though not dry enough to wear, are dry enough to iron.

(d) This is because it acts equally on every part of our body and so does not tend to alter the shape of our body. Also, the various solids and fluids of which our body is made are almost incompressible, and therefore the atmospheric pressure cannot affect them.

(e) The pressure at any tap on the water main will be equal to the pressure of a column of water of height equal to the difference between the level of the tap and that of the surface of the reservoir. If therefore the reservoir were taken 1000 ft. higher above the town, the water would have an increased pressure of 1,000 feet of water, i. e., about 500 lbs/sq. in which would burst every pipe in an ordinary supply.

Q. 94. State what kind of energy is changed to what other kind when

(a) By the slaking of lime a candle is burnt.

(b) A blacksmith hammers a horseshoe.

(c) When electricity is produced in an accumulator or a battery.

(d) When an electric motor is started.

(e) The sun warms the earth.

(f) When phosphorous glows in the dark.

(g) A photo is taken.

(h) When an apple falls on the ground.

Ans. (a) Chemical energy is converted into heat energy.

(b) Chemical energy that is discharged by the motion of the muscles is converted into energy of motion.

(c) Chemical energy gets converted into electrical energy.

(d) Electrical energy is converted into energy of motion.

(e) Heat energy is converted into radiant energy.

(f) When phosphorus glows in the dark chemical energy gets converted into radiant energy.

(g) When a photographic plate is made, radiant heat is converted into chemical energy.

(h) When an apple falls off a tree and hits the ground the energy of its motion is turned into *heat* and it becomes slightly warmer.

Q. 95. Write both in centigrade and in fahrenheit at what temperature water (a) boils and (b) ice melts.

How will you turn centigrade degrees into fahrenheit degrees and vice versa ?

Ans. Water boils at 100° Centigrade and 212° Fahrenheit.

Ice melts at 0° Centigrade and 32° Fahrenheit.

To turn Centigrade degrees into Fahrenheit degrees, we must multiply by 9, divide by 5 and then add 32.

Conversely to turn Fahrenheit degrees into Centigrade degrees we must subtract 32 and then multiply by $5/9$.

Q. 96. Arrange the following temperatures in order :—

Temperature of human body, temperature at which carbon melts, point at which alcohol freezes, temperature at which silver boils, the absolute zero, temperature of an oxy-acetylene torch, temperature of a bright coal fire, coldest temperature in Siberia, melting point of ice, boiling point of water, melting of sulphur, and temperature at which mercury boils.

Ans. Carbon melts at 3800°C ; temperature of an Oxy-Acetylene Torch is 2400°C ; temperature at which silver boils is 1955°C ; temperature of a bright coal fire is 600°C ; boiling pt. of Mercury 327°C ; melting of sulphur 112°C ; boiling point of water 100°C ; temperature of the human body 37°C ; melting point of ice 0°C ; coldest part of Siberia— 100°C ; Alcohol freezes at 118°C ; Absolute Zero— 273°C .

Q. 97. Answer the following :—

Why does a thick glass tumbler crack when boiling water is poured into it ? Why will it always crack when hot mercury at 150°C is poured into it and never cracks in hot air at 150°C ? How

will it behave differently if the tumbler is made of special glass such as Pyrex ?

If we surround a hot sauce pan with flannel why will it cool more slowly than if no flannel is wound round it ?

Ans. When boiling water is poured into a thick tumbler, the inside of the tumbler expands at once. Since glass conducts heat slowly the outside remains cold and does not expand. The inside forces the outside to become larger, and as glass has little tensile strength it at once cracks.

It is sure to crack when hot mercury at 150°C is poured into it, because the hot mercury discharges its heat much more quickly than hot water, and therefore the expansion is very rapid in the case of mercury and the glass is sure to crack.

In hot gas the heat on all surfaces of the tumbler both inside and outside is equal and therefore there is equal expansion of all sides. The glass will not therefore crack in the hot gas.

When a special glass, such a Pyrex, is used there is greater chance of withstanding rapid heating and cooling because such a glass has a low co-efficient of expansion and will therefore not crack so easily as the ordinary glass. When we surround a hot sauce pan with a flannel, we stop the air surrounding it from moving outside quickly and conducting away its heat. Both the flannel and the enclosed air are bad conductors of heat, and therefore since hot air not allowed to move out and get itself replaced by cold air, which it would otherwise do, the heat is not conducted away and the sauce pan retains its heat.

Q. 98. (a) What is the principle on which a thermos flask is made ?

(b) Explain the reason why a green house becomes hotter more quickly and cools more slowly than the air outside it.

(c) Show that the sun is the source of all life on earth.

Ans. (a) A thermos-flask is made on the principle that the worst conductor of heat is a vacuum. A thermos-flask is a double walled vessel with a vacuum between the walls. The side of the inner wall is also silver coated. When a hot liquid is poured into the thermos-flask there is little chance for the heat to escape, except that a little is conducted through the neck and the cork. The vacuum does not allow conduction of heat, while the silver in the thermos-flask reflects most of the heat rays back into the liquid and emits very few of them. Consequently, the liquid in the thermos-flask cools extremely slowly and keeps hot for a considerable time.

(b) Glass being a bad conductor of heat does not allow the heat rays to pass through, but it does not prevent the light rays to

pass. When the light strikes the plants inside the green house, its energy is turned into heat. The plants etc. thus become hot. They now both warm the air by convection and also give out heat rays. These, however, cannot pass out of the green house, but are reflected back by the glass. The result is that though the sun's energy has come in, it is not allowed to go out. The inside of the green house thus gets quickly warmer than the outside air, and also does not cool as quickly as does the outside air surrounding it.

(c) The green leaves of plants use the energy of light to cause the carbon dioxide of the air and water from the soil to combine and make starch and sugar which make the substances of which plants are made. All animals live either on plants or on animals which live on plants ; consequently the whole animal kingdom is dependent for food on the plant kingdom which in turn depends upon the sun's light to build itself up with its help from air and water. So both the animal and vegetable kingdom and for the matter of that, every living thing on earth is dependent on the sun's light for its very life.

Q. 99. Answer the following :—

(a) Which of the following are metals and which are non-metals ?

Sodium, Tin, Carbon, Mercury, Sulphur, Iodine, Cobalt, Nickel, Silicon, Chromium, Antimony and Phosphorus.

(b) Which of these are pure substances and which are mixtures ?

Water, Solder, Benzene, Gold, Iron, Petrol, Brass, Washing Soda, Milk, Rock crystal.

(c) Would life be possible on our earth if it had been as light as the moon or as heavy as, say, Jupiter ?

(d) What are the distances of the Moon, the Sun, Venus and Neptune from the earth ?

(e) What is an Astronomical Unit ?

(f) What is a Light Year ?

(g) What are the colours of the rainbow in order ?

Ans (a) The following are metals :—

Sodium, Tin, Mercury, Cobalt, Nickel, Chromium, Antimony.

The following are non-metals :—

Carbon, Sulphur, Iodine, Silicon, Phosphorus.

(b) The following are pure substances :—

Water, Benzene, gold, iron, washing soda and rock crystal.

The following are mixtures :—

Solder, petrol, brass, milk.

the temperature of the patient quickly. The scale goes from 95°F to 110°F, because this is the range between which a human being can be as cold or hot and still survive.

Q. 101. Explain the following :—

(a) **Mirage.**

(b) **Myopia**

(c) **Twenty carat gold.**

(d) **Efflorescence, water of crystallisation, deliquescence.**

(e) **Unripe fruit is sour. What causes it in grapes, in apples, in lemons? Why does this sourness disappear when they ripen?**

Ans. (a) **Mirage.** An optical illusion usually observed in sandy deserts when the object on the surface of the earth appears from a distance to be reflected as from water in its vicinity. Actually, the mirage is due to the equal heating of the different parts of the atmosphere which bends the light rays and so produces distorted images upside down, like a tree standing on a pond, whose image appears upside down.

(b) **Myopia** is short sight due to the eye being slightly too large, so that the incoming light is focussed before it reaches the retina. This error can be corrected by concave lenses.

(c) **Twenty Carat Gold.** The carat is the unit of purity in gold. The carat implies a twenty-fourth part, and chemically pure gold is 24-carat. When gold is twenty carat, it means that it has a mixture of 20 parts gold and 4 parts of some alloy in it.

(d) The property of certain hydrated crystals, like washing soda, to lose water and fall to powder when exposed to dry air, is called *efflorescence*. The property of certain substances, like caustic soda, which become damp on exposure to air and ultimately to form a solution is called *deliquescence*; when crystals are deposited from solution, they often contain a certain proportion of water loosely combined in them. This is called *water of crystallization*.

(e) Unripe fruit is sour because it contains acids. Grapes are sour because they contain tartaric acid; unripe apple is sour because it contains malic acid and lemon is sour because it contains citric acid.

This sourness in fruits disappears because when they ripen, acids are converted into sugars.

Q. 102. Complete the following sentences by filling in the gaps :—

(1) Sir Alexander Fleming first discovered.....

(2) Marconi, the.....scientist invented.....He was awarded the Nobel Prize for.....in.....

(3) Pitchblende is an oxide of.....From this pitchblende were isolated.....by.....

(4) Many lives of miners have been saved by Sir Humphrey Davy's.....

(5) The unit for measuring a ship's speed is.....

(6) Ammonia was first synthesised from nitrogen and hydrogen by.....

(7) William Harvey first demonstrated the.....

(8) Sir Henry Bessemer discovered a process for the manufacture of.....

(9) The tree from whose bark a specific for malaria is obtained is called.....

(10) Gregor Mendel formulated an important law of.....

(11) The Periodic Law of the atomic weights of chemical elements was framed by.....

(12) It was.....who proved that vaccination produced immunity from small-pox.

(13) In the year 1951 the Nobel Prize for Physics was awarded to.....while that for medicine was awarded to—

Ans. (1) Sir Alexander Fleming first discovered *Penicillin*.

(2) Marconi, the *Italian* scientist, invented *wireless telegraphy*. He was awarded the Nobel Prize for Physics in 1909.

(3) Pitchblende is an oxide of uranium, thorium, radium, lead etc. From this pitchblende were isolated *radium and polonium*.

(4) Many lives have been saved by Sir Humphrey Davy's *Safety Lamp*.

(5) The unit for measuring a ship's speed is a '*knot*'.

(6) Ammonia was first synthesised from nitrogen and hydrogen by *Haber*.

(7) William Harvey first demonstrated the *Circulation of blood*.

(8) Sir Henry Bessemer discovered a process for the manufacture of *steel from molten pig-iron*.

(9) The tree from whose bark a specific for malaria is obtained is called *Cinchona*.

(10) Gregor Mendel formulated an important law of *heredity*.

(11) The Periodic Law of the Atomic weights of chemical elements was framed by *Dmitri Ivanovich Mendeleev*.

(f) There are two kinds of food a man requires for the maintenance of life and health. One class is the body building foods and the other the "fuel" foods.

The body building substances come mainly from proteins, which are found in meat, fish, milk, cheese, eggs, cereals, pulses, peas, beans, lentils, nuts etc. etc. The foods which give heat and muscular energy are mainly fats and oils, cereals, sugar, pulses, fruits, potatoes etc.

(g) Because white clothes absorb less of the sun's heat than do black clothes.

(h) The earth remains only in its orbit because the sun's attraction exactly balances its tendency to fly off in a straight line.

(i) An atom is the smallest unit of an element which can take part in a chemical reaction. *A molecule is a particle made up of several atoms closely united.*

(j) Water has the maximum density at 4°C . When it turns solid and becomes ice by cooling, the ice is still lighter than water at 4°C . The result is that ice floats on the water and covers the surface instead of sinking at the bottom. It therefore forms a solid barrier to more cold penetrating to the water below and freezing it. The bottom of a lake thus never gets frozen.

(k) The difference between hard and soft water is that the former is water which will not easily lather with soap, but forms a curdy precipitate. This is due to the presence of calcium or magnesium compounds or both. When these are absent, the water is soft, and the lather is easily formed.

(l) The so-called black lead is not lead, but graphite, a form of carbon. Red lead is an oxide of lead.

Q. 105. Supply the information required against each of the following :—

(a) (1) The rate at which sound travels and (2) at which light travels.

(b) What is an atomic weight? Give the atomic weights of Hydrogen, Oxygen, Nitrogen?

(c) What is a lactometer?

(d) By what ways do animals manage to escape their enemies?

(e) What everyday foods are the main sources of calcium, phosphorus, iron and iodine?

(f) Which of the following products are obtained from petroleum :—Naptha, paraffin wax, paraldehyde, kerosene,

chlorine, lubricating oil, vaseline, novocaine, coal tar and petrol.

(g) What parts of the body are affected by the following diseases ? :—

Caries, gingivitis, Bright's disease, cancer, cataract, sinusitis, sciatica, pericarditis, otitis, Hodgkin's disease, keratitis.

(h) How do earthworms benefit the soil ?

(i) What are amphibians ?

(j) What is cork made of ?

(k) Which fumigants are extensively used for protection from insect pests of food grains ?

Ans. (a) (1) Sound travels at the rate of 1,100 ft. per second.

(2) Light travels at the rate of 186,000 miles per second.

(b) By atomic weights is meant the relative weights of the atoms of different elements.

The atomic weight of Hydrogen is 1, of Oxygen 16; Nitrogen 14.

(c) An instrument for measuring the amount of butter fat in milk.

(d) Following are some of the ways by which animals manage to escape their enemies :—

1. **By protective coloration.** A large number of insects have a greenish or brownish colour which is hard to see against a background of vegetation or of earth and rubbish. The green caterpillar of the cabbage butterfly is almost invisible as it crawls among green leaves. Polar leaves have white skins.

2. **By mimicry.** Some insects, for example, the leaf insects, are hardly distinguishable from the leaves they dwell on and so escape observation.

3. **Excessive fertility.** Some animals, like the tadpole of a frog, are produced in such excessive numbers, that some of them are sure to escape from their enemies and thus carry on the race.

4. Many small insects are left alone, because they are very bitter and nauseous to the taste.

Many small animals like the woodlice and centipedes escape by hiding under stones or holes in earth or in crevices in the trees during day time and come out only during night when they are not seen. Earthworms, slugs and snails come out only during night time.

6. **Speed.** Some animals have very high speed, as for example, the deer, the hare, the horse. Similarly many kinds of

insects like the dragon fly, the common fly, the butterfly, the hover fly, escape by rapid flight or by leaping like the grasshopper.

7. **Defensive armour.** Many animals like the crabs, the tortoises and turtles and the lobsters have armour on their bodies. Many have sharp spikes like the hedgehog or the porcupines. Many have poisonous stings like the spiders and centipedes.

8. **Social habits.** Many bees live in swarms and if they are attacked they attack the enemy in turn in swarms and with a fury which few will dare face.

(e) Calcium is obtained from cheese, green vegetables and treacle; phosphorus from cheese, egg yolk, chocolate, oatmeal etc.; iron from fruits like apple, beans, treacle, oatmeal, yolk of egg etc.; iodine from fish, butter milk, spinach.

(f) The following are the products obtained from petroleum :—

Naptha, paraffin wax, lubricating oil, vaseline, petrol and kerosene.

(g) Caries affect the teeth; gingivitis the gums; Bright's Disease the kidneys; cancer all parts of the body; cataract the eye; sinusitis the cavities behind the nose; sciatica the great sciatic nerve, causing pain from the hip down the back of the thigh; pericarditis the pericardium round the heart; otitis the ear; Hodgkin's disease the lymph glands and spleen; keratitis the cornea, the membrane in front of the eye.

(h) Earthworms progress through the ground by swallowing the earth as they burrow and cast it up, thus breaking, ploughing and ventilating the earth.

(i) A class of cold blooded vertebrates, intermediate between the fishes and reptiles. They are called amphibians because they can live both on land as well as in water. Frogs, newts, toads and salamanders are all amphibians.

(j) Cork is the bark of cork oak tree.

(k) A mixture of ethylene dichloride and carbon tetrachloride; also D. D. T.

Q. 106. What is the importance of the following in the history of science :—

(a) Linnaeus

(f) Pasteur

(b) Lord Rutherford

(g) Lavoisier

(c) Mendel

(h) Galileo

(d) Charles Darwin

(i) Lister

(e) Benjamin Franklin

(j) Lamarck

(k) **Liebig Wohler**(m) **Sir Robert Watson-Walt**(l) **Freud**

Ans. (a) **Linnaeus** is the founder of modern botany. He was the first to expound the true principles for defining genera and species. These have formed the basis of modern classification.

(b) **Lord Rutherford** is the pioneer of the modern atomic science. He split up the atom for the first time and paved the way for future nuclear research.

(c) **Mendel**. It was Mendel whose researches and observations resulted in the famous law of heredity which bears his name. His researches on heredity thus laid the foundation of the modern scientific study of the subject.

(d) **Charles Darwin**. Darwin's work revolutionized thought in the scientific study of life. He may be said to have taken evolution out of the region of pure imagination, and by giving it a basis of fact, set it pure as a reasonable working hypothesis. Scientists now do not believe in fanciful theories of the origin of species, specially of the human race, as expounded by different religions.

(e) **Benjamin Franklin**. Franklin's importance in the history of science lies in the fact that it was he who first proved that lightning is only a form of electricity. He is also credited with the discovery of the distinction between negative and positive electricity.

(f) **Pasteur**. Pasteur's discovery of the causes of fermentation in alcohol and milk and the proof that the organisms stimulating it were contained in the atmosphere laid the foundation of antiseptic surgery.

(g) **Lavoisier** is the father of modern chemistry. He was the first to prove that combustion is a form of chemical action.

(h) **Galileo**. He was the first to discover the law of falling bodies. He is the founder of Dynamics. His discoveries in Physics paved the way for those of Newton.

(i) **Lister**. Lister's discovery of the antiseptic treatment has revolutionized surgery and made the surgeon's work so safe after his operation.

(j) **Lamarck**. Lamarck was the precursor of Darwin by propounding his theory of the evolution of animals known as Lamarckism.

(k) **Liebig Wohler**. Wohler first artificially synthesised urea and thus laid the foundation of organic chemistry.

(l) **Freud** is the founder of the study of psycho-analysis.

(m) **Sir Robert Watson Walt**, 59 years old Scottish scientist, inventor of Radar, gave Britain a head start in defence against

enemy air-craft during the war. Has been awarded £50,000 by a Royal Commission.

Q. 107. Explain why—

(a) Ships use the gyroscope.

(b) Milk turns sour.

(c) An electric light bulb makes a bang when it is broken.

(d) Is it possible for telephones to spread infectious diseases? If so how.

Ans. (a) The gyroscope is used in ships for securing greater accuracy in steering as it has a relative stability against external forces.

(b) Milk turns sour by the lactic bacteria in the atmosphere, which produces lactic acid, which turns it sour.

(c) The air from the light bulb is exhausted so that the filament inside may not get tarnished by the oxygen of the air inside it. When on striking against anything it gets broken the air rushes with such a force into this vacuum that a bang is produced.

(d) This is quite possible, because a person or persons speaking into the phone may be suffering from some contagious disease and his or their saliva may get stuck to the mouth-piece along with the germs in it. A person who next speaks into the mouth-piece may get the disease through his mouth, specially if he applies very close to the mouth-piece.

Q. 108. Complete the following statements by selecting the proper word or words. Cross out word or words not required :—

(a) Carbohydrates are the chief foodstuffs of animals. They include (proteins), (sugars), (mineral matters), (starches) and (cellulose).

(b) The melting of ice is a (physical) (chemical) (compound) change.

(c) Alpha rays travel with a speed of (12,000 miles per second) (186,000 miles per second) and have (very great penetrative power) (small penetrative power).

(d) Uranium is the ultimate parent body of a variety of (tungsten) (platinum) (chromium) (lead) (zinc).

(e) Radio transmission is (better) (worse) in the day time than in the night.

(f) At the tops of high mountains where the air is much less dense voices sound very (loud) (weak).

(g) A slow falling barometer indicates the approach of (frost) (rain) (sunshine).

Ans. (a) Carbohydrates are the chief foodstuffs of animals. They include sugars, starches and cellulose.

(b) The melting of ice is a physical change.

(c) Alpha rays travel with a speed of 12,000 miles per second and have small penetrative power.

(d) Uranium is the ultimate parent body of lead though the change takes millions of years.

(e) Radio transmission is worse in the day time than in the night.

(f) At the top of high mountains, where the air is much less dense, voices sound weak.

(g) A slow falling barometer indicates the approach of rain.

Q. 109. Fill the blanks in the following :—

(a) (1) Blood is red because of red corpuscles which owe their redness to...

(2) The amount of blood in a normal human body is about.....in weight.

(b) (1) Why does a small wound normally cease to bleed in three or four minutes?

(2) What is the use of the white corpuscles in the human blood?

(3) How does the blood circulate in the body? Explain this only in a few lines.

(4) Explain the terms : analysis, synthesis and electrolysis.

(5) If a strong acid, like the Sulphuric or Hydrochloric, fell accidentally on your skin or clothes, what will you do immediately to remove their harmful effect?

(6) Which of these are acids, bases or salts?

Oil of vitriol, slaked lime, salts of lemon, "milk of magnesia", sal ammonia, aspirin, aqua fortis, sugar of lead, saltpetre, sodium sulphate, sodium chloride, sodium hydroxide, magnesium sulphate and alabaster. Give the chemical names of those not given here.

Ans. (a) (1) Blood is red because of red corpuscles which owe their redness to haemoglobin.

(2) The amount of blood in a normal human body is about 15 lbs. in weight.

(b) (1) The blood contains *fibrinogen*. When the skin is injured and blood begins to flow, this *fibrinogen* is converted into a tough jelly-like material known as *fibrin*. This causes the blood to clot and in this way to seal up the wound and to stop the bleeding.

(2) The white corpuscles digest any foreign particles that come into the blood. They destroy bacteria and dead tissue cells. They thus work as defenders and scavengers of the body.

(3) The blood laden with waste matter and having lost much of its oxygen when returning from the various limbs enters the right side of the heart. It then goes from here to both lungs, where it loses its carbon dioxide and gets a fresh supply of oxygen. From the lungs it travels back to the left side of the heart and is then pumped into the main artery, called the *aorta*. This *aorta* divides into several arteries, some going to the arms, some to the head, some to the bowels, liver and other vital organs, some to the legs etc. and after supplying the nourishing food to various organs by small capillaries it comes back by various veins which collect together to pour the blood into the right side of the heart again.

(4) When the ingredients of a body are separated by physical or chemical means, as separating the hydrogen and oxygen of water, the process is an *analysis*, when by chemical processes a compound is produced from its elements, the process is a *synthesis*. When chemical compounds are broken up into their original elements by the passage of electricity through their solution, the process is called an *electrolysis*.

(5) The skin or the clothes should be washed off with, first, a large quantity of water, then with a mixture of a little ammonia (an alkali) with a good deal of water.

(6) Following are the acids.—

Oil of vitriol *i.e.*, sulphuric acid ; Salts of lemon, *i.e.*, oxalic acid ; Aspirin *i.e.* acetylsalicylic acid ; Aqua Fortes, *i.e.*, nitric acid.

Following are bases :—

Slaked lime, *i.e.*, calcium hydroxide ; Milk of magnesia *i.e.* magnesium hydroxide ; Quicklime *i.e.*, calcium oxide ; Ammonia ; Sodium hydroxide, *i.e.*, caustic soda.

The following are the salts :—

Sal ammoniac *i.e.*, Ammonium Chloride ; Blue vitriol *i.e.*, Copper Sulphate ; Chalk *i.e.*, Calcium Carbonate ; washing soda *i.e.*, Sodium Carbonate ; Sugar of lead *i.e.*, Lead acetate ; Saltpetre *i.e.*, Potassium nitrate ; Sodium sulphate, also called Glauber's salt ; Sodium Chloride, our common salt ; Magnesium sulphate called Epsom salt ; Alabaster *i.e.*, Calcium sulphate.

Q. 110. Answer the following :—

(a) Why do we pant after hard exercise ?

(b) Why do we become hot when taking violent exercise ?

(c) What is wood chiefly made of ?

(d) What do we call essential oils ? What are mineral oils ?

(e) What—

(i) is the use of a paravane, (ii) is the function of a carburetor, (iii) are the two relevant properties of a gyroscope, (iv) is the difference between Bacteria and Viruses.

(f) What is the function in the human body of (i) The salivary glands (ii) The Pancreas (iii) The liver (iv) The Pituitary glands (v) Adrenal glands ?

(g) Where would you find the following glands in the human body :

The thyroid, the parathyroid, the adrenals, the pituitary body, the thymus and the pineal body.

(h) Why does a soap bubble look coloured in white light ?

(i) How would you make us believe that the whole universe is made up of the same materials ?

(j) How is rainbow made ?

(k) Why is soap so effective in cleaning things ?

(l) Will paint dry quicker in (i) dry than in moist air (ii) summer than in winter ?

(m) Name some of the chief foodstuffs which are practically made of starch ?

(n) Which of these contain as their major ingredients (i) Protein (ii) Starch (iii) Cellulose ?

Cotton, straw, rice, arrowroot, hemp, casein, cassava (tapioca), gluten, keratin, linen, gelatin, egg, albumen, peas, beans maize, myosin, jute, potatoes, coir, haemoglobin and wood.

Ans. (a) Exercise makes us pant. The reason is that much oxygen is needed to remove the lactic acid formed in the muscles, as well as the carbon dioxide produced, so the gas circulating organs, that is, the lungs, must work overtime and this is done by a rapid intake of air which supplies this wanted oxygen. The air is transferred from the lungs to the muscles by the blood; accordingly during exercise the heart works harder and has to pump the blood round the body many times than it does when the body is at rest.

The quick need of oxygen to oxidise the lactic acid and the efforts to remove the waste products causes the accelerated movement of the lungs and the heart and this makes us pant.

(b) A muscle is an efficient engine, but at best it turns some 40 per cent of the energy supplied to it into work. The rest appears as heat. That is why during exercise when the muscles are doing their work in making the body run or make the limbs move faster, the rest of the energy is used up in making the body hotter and hotter.

(c) Wood is chiefly made of cellulose.

(d) Essential oils are substances which give plants their characteristic odours, e.g., oil of lemon, oil of roses, oil of lavender. Mineral oils are hydrocarbons, e.g., petroleum, paraffin oil, motor oil etc.

(e) (i) The paravane is used to remove mines from a ship's path by deflecting them along a wire and severing their moorings; (ii) The function of a carburettor is to project minute droplets of fuel into the air passing into the cylinders so that a suitable explosive mixture may be formed for ignition by the spark; (iii) one of the properties of a gyroscope is that it is able to rotate in any plane. The second property is what is called precession, i.e., when a force is applied to it which tends to alter the plane in which it is rotating, or, in other words, tending to change the direction in space of its spinning wheel, the gyroscope resists this force and turns in such a way that the plane and direction of the spinning disc become the same as those of the applied force. (iv) Bacteria are minute organisms consisting of a single cell composed of protoplasm. Their place in nature lies between the simplest vegetable organism, such as the fungi and algae and the simplest of the microscopic animals, the protozoa etc. They can be clearly seen under the microscope.

The viruses are another type of such small organisms but they are so small that they pass through the bacterial filter, that is, where bacteria would not pass, viruses would.

Bacteria cause pneumonia, diphtheria, scarlet fever, venereal diseases, anthrax, cholera, measles, tuberculosis etc.; diseases carried by viruses are those of foot and mouth: rabies, yellow fever, canine distemper, smallpox, typhus, mumps etc. So both are different organisms.

(f) (i) The salivary glands secrete a watery fluid which serves to moisten the inside of the mouth and throat, while the ptyalin and other enzymes which it contains help to digest the starchy contents of the food, before it passes on to the stomach. (ii) The pancreas secrete ferments necessary for the digestion of starch, protein and fat. It contains little patches of cells called the islets of Langerhans which secrete insulin, which breaks down sugar and

turns it into glycogen, which is absolutely necessary for the work of the body. The absence of this insulin causes diabetes. (iii) The function of the liver is to separate impurities from the venous blood and to change all the sugars in the body into glucose, which, with the help of the insulin from the pancreas, it stores up as glycogen. The liver also changes the nitrogen of the amino-acids derived from the proteins in the meal into urea, which is excreted by the kidneys. (iv) The chief function of the testes is to make spermatozoa, which are always stored in readiness for the act of generation. (v) The function of the pituitary gland is to control the growth of bones, to secrete a hormone which stimulates contraction of voluntary muscles, as also the secretion of the kidney and milk-glands. Its hormones also seem to be substances which at puberty stimulate testes and ovaries to grow and to produce their own hormones, which cause the bodily and mental changes which occur at this time. The gland also seems to produce a substance which regulates the activity of the thyroid gland. (vi) The adrenal glands secrete two distinct hormones, from their two distinct parts, i.e., the cortex and the medulla. The hormone from the cortex is necessary for the proper digestion of the food in the bowel and the proper growth and development of the sex gland. The medulla secretes the adrenaline which contracts the blood vessels of the belly and skin so that more blood is available for heart, lungs, brain and voluntary muscles. This adrenaline seems also to act directly on the organs without the assistance of the nerves and produces the set of symptoms of the rage and fear which an animal feels when confronted by an enemy. The protruding and wide opening of the eyes, the dilation of the pupils, the beating of the heart more strongly and rapidly, the temporary ceasing of digestion to release blood for the muscles which may be needed for combat or flight, the becoming pale of the skin etc. etc. are all the effects of this adrenine (or adrenaline).

(g) The thyroid gland lies on each side of the trachea; the parathyroid gland lies close to the thyroid; the adrenal glands lie close to the kidneys; the pituitary lies at the base of the brain; the thymus is situated at the lower part of the neck; pineal body is situated in the brain in front of the cerebellum.

(h) "A soap bubble looks coloured in white light because this is a mixture of lights of all wavelengths, each wavelength causing in our eyes the sensation of a particular shade of colours. If the film at a particular place is of the right thickness to "interfere" with, say, yellow light, this will be destroyed, but the other coloured lights will be reflected back to the eye, and will give the sensation of those colours. As the soap-bubble changes in thickness, so the colours change too.

(i) It is a well known fact that when chemical elements are heated in a flame or made to glow in an electric discharge tube they give out light of certain wavelengths. Thus mercury gives a

blue green light ; sodium vapour yellow ; copper vapour green etc. etc. If the light from these is focused on a photographic plate by a spectrograph the lines can be photographed and their position measured. It has been well established that the spectrum of each element is made up of hundreds of lines and that every element gives a different spectrum. Thus by photographing light through a spectrograph, we can find what elements are in the hot gases which give out the light in question. The spectrum of the sun and the stars can be examined in this way. We find that *they contain lines corresponding to chemical elements of this earth.* This clearly proves that they contain many of the elements of our earth, and, as far as we know, no other. This thus proves that the whole of the universe is made up of the same elements.

(j) The rainbow is a spectrum produced by the refraction of light by rain drops in the air. It is produced when sun-light passes through water drops at a certain angle.

(k) Soap is so effective in cleaning things because it *lowers the surface tension of water.* This makes it possible for water to wet greasy surfaces and so carry away the grease and dirt together.

(l) Paint does not dry more quickly in moist or dry air. Its drying is a chemical reaction, therefore this is hastened by warmth. Consequently it will dry more quickly in summer than in winter.

(m) Our chief foodstuffs which contain starch are :—wheat, rice, maize, potato, sago, arrowroot, peas, beans, cassava etc.

(n) Cellulose is contained in the ingredients of the following articles : coir, jute, hemp, cotton, linen, wood and straw. Proteins are contained in gluten, myosin, casein, haemoglobin, gelatin, fibrin, egg-albumin, keratin.

The rest contain starch.

Q. 111. What are the sources of :—

Castor oil, suet, lard, whale oil, arachis oil, palm oil, cocoa butter, tallow, linseed oil ?

To what uses are the above oils and fats put ?

Ans. Castor oil is obtained by crushing the seed of castor oil plant. It is used in medicines chiefly as a purgative ; also in soap, as a lubricant and as an oil for lamps. Suet is obtained from beef fat and is used for soap, candles, margarine etc. Lard is strained and purified pig's fat. It is used in cooking, in the manufacture of margarine, the production of candles, for soaps and for face creams. Whale oil is obtained from the blubber of whale and is used for soap, margarine, leather dressing, lubricant. Arachis oil is obtained from pea-nut and is used for soap and as a cooking oil and in the manufacture of butter substitutes. Palm oil is obtained from the kernel of the palm tree and is used for making soap, and candles. Cocoa

butter is obtained from cocoa bean and is used for making chocolate. *Tallow* is the product obtained from cattle and sheep by melting their fat under steam pressure in iron cylinders. It is used as food, for soap and candles, dressing leather and as a lubricant. *Linseed oil* is obtained from the seed of flax and is used for paints and varnishes, printing ink, linoleums etc.

Q. 112. Give the composition of milk.

Ans. Milk is a watery solution of fat, casein, albumen, ash and lactose.

Q. 113. What preventive measures would you take to avoid infectious diseases? What measures does the surgeon take to guard against bacteria?

Ans. To avoid infection following measures may be used.—

(1) Drinking water should be absolutely clean, and taken from a water tap. (2) The milk used must be pasteurised and boiled and covered before it is cooled for drink. (3) Infectious patients must be separated. (4) Food must be well cooked in clean utensils and covered. (5) All damp, ill ventilated and crowded places must be avoided. Fresh air and sunlight should be sought. (6) All cuts in the body must be cleaned and disinfected. (7) The body must be kept fit and well nourished.

The surgeon guards against bacteria by the following precautions :—

(a) By using recently boiled or steam heated instruments, or instruments kept under spirit. (b) By using sterilized dressings. (c) By sterilizing the patient's skin with chemicals and making him put on clean sterilized clothes. (d) By wearing sterilized clothing during operation. (e) By wearing a mask to prevent infection by saliva droplets.

Q. 114. To what uses are the following put? What are their advantages and disadvantages?

A petrol engine, diesel engine, gas engine, a turbine,

Ans. A petrol engine is used for driving cars and lorries and aeroplanes. It has the advantage of having light weight and is able to generate high speed with small quantity. It can be handled by unskilled labour and is suitable for small units. Its disadvantage is that the fuel is comparatively very expensive and it has a shorter life and less reliability than the steam engine. The diesel engine is used for driving ships. It has the advantage of using cheap fuel and great efficiency, but it is unsuitable for small units. The gas engine is used for power for factories. The fuel is cheap if pro-

ducer gas is employed. Its disadvantage is that it cannot be used for locomotives and cars etc. The turbine is used for the generation of electricity and for driving large ships. Its advantage is that it uses cheap fuel and has high efficiency. Its disadvantage is that it has a very high speed and is not suited to small units.

Q. 115. Answer the following :—

(a) Why is hoar frost commonly seen on twigs, grass, fallen leaves etc., but rarely on the bare ground ?

(b) During winter is there more likelihood of hoar frost on a cloudy night or clear night ? Give your reasons for your conclusion.

(c) Why is diamond so very brilliant ?

(d) What is the wavy and trembling appearance of objects seen through the hot air ascending from a chimney due to ?

(e) Water looks shallower and an object in it looks larger than it really is. What is this due to ?

(f) Why does a stick partly immersed in water appear to be bent ?

(g) Why do we prefer to have convex mirrors in our cars than plain mirrors ?

(h) What are ferns, algae and fungi ?

(i) Swimming baths swarm with bacteria from the saliva, perspiration and other harmful products of the bathers. What methods are used to keep them free from these harmful sources ?

(j) What is an ordinary glass made of ? Why is it particularly suitable for chemical apparatus ?

Ans. (a) The earth contains a store of heat which is conducted from its interior, so dew or frost does not condense on the bare ground. Grass, twigs or fallen leaves do not receive heat by conduction from the earth ; so they cool more quickly and most of the dew or frost settles on them.

(b) There is more likelihood of hoar frost on a clear than on a cloudy night. The reason for this is clear. On a clear night heat is radiated from the earth, grass, twigs, leaves etc. and these rapidly grow cooler. On a cloudy night the clouds reflect back a good deal of heat radiation to the earth and therefore there is comparatively less cooling of objects on the earth. On a clear night there would be no such receiving back of heat radiation, so the temperature of the ground usually falls below the dew point and dew or frost will condense on everything lying in the open.

(c) The brilliancy in diamond is due to two chief reasons : (1) It has a very high refractive index, due to which the light that enters

it is totally reflected several times before it leaves the stone. (2) It has a very high dispersion, which means that the blue rays are bent much more than the red. The diamond thus separates the blue rays from the red, which is the cause of 'fire', i.e., the play of colours in the stone.

(d) The wavy and trembling appearance of objects seen through the hot air ascending from a chimney is due to the light rays being bent as they pass from the denser cold air to the lighter hot air and vice versa.

(e) Water looks shallower and an object looks larger than it really is because the light rays from the object at the bottom of a cup filled with water diverge as if they had come from an object much nearer the eye.

(f) A stick partly immersed in water appears to be bent on account of the divergence of the light rays from the denser body (water) to the rarer (air) object.

(g) We prefer to have convex mirrors on our driving cars because a much larger field of view is given by them than by plane mirrors.

(h) *Ferns* are a group of non-flowering plants belonging to the cryptogamic class. The most well known are horse tail, club moss, *salaginella* etc.

Mosses are small flowerless plants which represent an early stage in plant development. They have leaves, stems and fine hair which play the part of roots. They reproduce themselves by spores. They are higher than fungi owing to the presence of chlorophyll, but lower than ferns as they lack fibrous vascular tissues. The algae are the seaweeds and the green thread like plants which grow on plants.

Fungi. Fungi are not green plants. A fungus consists of a mass of fine threads consisting of colourless cells set end to end. All moulds are fungi. Mushrooms and toadstools, rust, smut, mildew and mould are all fungi.

(i) The modern method is to add the bactericides like bleaching powder, sodium hypochlorite or chlorine in small quantities and to pump the water continuously through filters and continuously bring in fresh water or empty the baths at short intervals.

(j) Glass is a mixture of two or more of the silicates of sodium, potassium or lead. It is very resistant to chemical action and that is why it is particularly useful for chemical apparatus.

Q. 116. What is the composition of the following alloys and to what uses are they put?

Brass, Solder, Bronze.

Ans. Brass is composed of copper and zinc in the proportion of two to one. The alloy is used for ornamental materials and machine parts and utensils.

Solder is used for joining metals. Two kinds of solders are prepared (i) Soft solders which are alloys of tin, lead and bismuth used for metals which melt at a comparatively low temperature (ii) hard solders which are made of copper and lead and sometimes of silver for precious metals.

Bronze is an alloy of copper, tin and zinc. The copper in it is usually about 85%. Being hard, strong and tough it is used for machine parts, a ship's propellers, bells, coins, etc.

Q. 117. Answer the following :—

- (a) If you found a man unconscious and lying on a live wire, what would you do ?
- (b) What kind of iron will not rust ?
- (c) Knife kept in a trouser pocket never rusts. Why ?
- (d) What is the use of chromium plating ?
- (e) How is it that though glass is transparent, powdered glass is not ?
- (f) What colour of light will be given on a flame by sodium vapour, copper vapour, neon and mercury vapour ?
- (g) Why will a fish get drowned in water which has been boiled and then rapidly cooled to allow the fish to bear the heat of water ?
- (h) From what is phenol obtained ? Why is it a good disinfectant ?
- (i) Why is crude glycerine mixed with the water of the radiator of a car during winter in cold countries ?
- (j) What are the uses to which animal and vegetable oils and fats are put ?
- (k) What is honey made of ?

Ans. (a) The best thing would be to put rubber gloves on and pull the man away from the live wires. If such gloves are not at hand then push the man away with an absolutely dry wooden stick, taking care not to touch him with a naked hand as electricity is passing through the man's body, and the rescuer is in danger of being killed himself if he does not take this ordinary precaution.

(b) Absolutely pure iron prepared by electrolysis will not rust, unless one part has been made electrically different from another, e.g. by straining or scratching it.

(c) This is because liquid water does not touch the iron blade of the knife in the pocket. Only liquid water can cause rusting.

(d) Chromium plating is done to give the body a brilliant polish. It does not tarnish and it has a very beautiful blue-white lustre. It is therefore an excellent metal for coating anything.

(e) Though glass is transparent, powdered glass is not. This is due to the fact that owing to refraction and reflection light passing through powdered glass is bent in all directions or reflected back again. This prevents it from being transparent.

(f) Sodium vapour gives yellow colour, copper vapour will give a green colour, while that of neon will be red and mercury a blue green.

(g) The fish will get drowned on account of the expulsion of the dissolved oxygen of the air, when the water was being boiled. It will thus miss this oxygen and breathing will be impossible to it.

(h) Phenol is obtained from coal tar. It is a very poisonous substance. It is also poisonous to bacteria and for this reason it is a good disinfectant.

(i) A mixture of glycerine and water freezes at a lower temperature than is usually reached even during winter in majority of the cold countries, consequently crude glycerine is often mixed with the water of the radiator of a car to prevent it freezing and so bursting the waterways.

(j) The uses to which animal and vegetable oils and fats are put are the following :—

(1) As foodstuffs (2) As lubricants (3) As the raw materials of linoleum (4) In the manufacture of margarine (5) As protective substances in paints and varnishes (6) In the preparation of soap (7) For making fatty acids to be used for candles, oil lamps etc.

(k) Honey consists largely of glucose.

Q. 118. Why is it necessary for each animal and plant to have many offsprings? How is it that the largest and most intelligent animals have fewest young?

Ans. The largest and most intelligent animals have fewest offsprings because they protect and bring up their offsprings very carefully, while wild animals or those which have innumerable enemies must produce in large numbers to enable some of them to escape their enemies and carry on the race. Of all living beings man is the most intelligent and protects his progeny with great care; nature, therefore, does not make the woman as prolific as many

animals. A frog produces several thousand eggs at a time, majority of which hatch to become tadpoles, but the fish, the water-beetle, larva and the dragonfly larva work havoc among them and allow few to escape. Those that do are mostly eaten by birds and snakes, so that only a very small number survive. It is said that oysters produce about twenty million young at a time. Where all or majority of them to survive, and each survivor were to multiply like its parents, the earth would soon be filled with oysters, but since their number remains almost the same, we conclude that nearly all of them get killed.

A single tree produces innumerable seeds each season, but very few survive in most favourable surroundings to produce fresh plants.

Q. 119. What kinds of plants will you find in ?

(a) Tropical rain forests (b) Temperate regions (c) Sub-arctic regions (d) Dry sandy heaths (e) Peaty marsh.

Ans. (a) In tropical forests, plant life is active all the year round, hence the plants are mostly evergreen. (b) In temperate regions there is a season of warmth and rapid growth followed by that of cold when growth ceases, hence plants are mostly those belonging to the deciduous species. (c) In sub-arctic regions the warm season is very short and there is not much heat for active growth, so there grow some evergreen plants which are resistant to cold. They have leaves all the year round always ready to take advantage of what little warmth and light they can get: (d) In sandy heaths and low growing moorlands shrubs are found. (e) In peaty marshes since there is much acid water, the soil is not congenial to growth of plant life. Only such insectivorous plants as butterwort and sundew grow which capture flies with their sticky secretion, digest them and use the nitrogen compounds of their bodies for their own growth.

Q. 120. To what uses are the following metals usually put :

(a) Gold (b) Silver (c) Zinc (d) Aluminium (e) Magnesium (f) Tin ?

Ans. (a) Gold is mostly used in jewellery, dental parts, coinage and as a medium of exchange ; (b) silver is used in electroplating, jewellery and coinage ; (c) zinc is used in the production of galvanized iron, as an alloying element, for roofing sheets, buckets, wire netting etc. ; (d) aluminium is mostly used for aeroplane parts, domestic utensils, electric cables etc. It forms strong light alloys, such as duralumin and magnalium which are extensively used in aeronautical engineering ; (e) magnesium is used in fire-works, star shells, flash powders and in the manufacture

of light alloys such as magnalium ; (f) Tin is largely used for the manufacture of tin plates and for wrapping cigarettes, chocolate, confectionery etc.

Q. 121. (a) Why is defective wiring often the cause of fire ?

(b) Why do children need more food than adults in proportion to their weight ?

(c) What are the chief salts in a perfect diet ?

(d) What is dietetics ?

(e) What is the use of food to an animal ?

Ans. (a) If wiring is defective, two bare wires may accidentally touch each other. The resistance of the circuit becomes only one or two ohms or even less and an extremely large current flows. The wires then become very hot and may melt, which may cause fire.

(b) Children require more food than adults in proportion to their weights first because of their comparatively more rapid growth which requires much energy and secondly because the smaller an organism is the greater is its rate of losing heat. This heat must be got from more food.

(c) The chief salts are the common salt, i. e., sodium chloride and the salts of calcium, potassium, magnesium and iron.

(d) Dietetics is the branch of science which deals with food and nutrition in health and disease and with the part it plays in the economy of the animal, particularly man.

(e) (i) It produces the energy manifested either as heat or work (ii) It furnishes material for growth, reproduction and repair. (iii) It provides substances for regulation of energy production for all living being.

Q. 122. Arrange the following in order of their contents of :—

(a) Proteins (b) Carbohydrates (c) Fats. Each may be given separate heads as :—

Proteins.

(a).....

(b).....

(c).....

(d).....

Carbohydrates

(a).....

(b).....

(c)

(d)

Milk, butter, potatoes, cheese, eggs, bacon, wheat, flour, dry peas, sugar and fish.

Ans. Proteins	Fats	Carbohydrates
(a) Cheese	(a) Butter	(a) Sugar
(b) Dry peas	(b) Bacon	(b) Wheat flour
(c) Eggs	(c) Cheese	(c) Dry peas
(d) Wheat flour	(d) Eggs	(d) Cheese
(e) Fish	(e) Milk	(e) Potatoes
(f) Bacon	(f) Dry peas	(f) Milk
(g) Milk	(g) Wheat flour	(g) Bacon (none)
(h) Potatoes	(h) Fish	(h) Fish (none)
(i) Butter	(i) Potatoes	(i) Butter (none)
(j) Sugar	(j) Sugar (none)	(j) Eggs (none)

The above articles are arranged as a, b, c, d..... in the order of their contents of proteins, fats and carbohydrates.

Q. 123. In human digestion what parts of our food make :—

(a) Glucose (b) amino-acids (c) glycerol.

Ans. The carbohydrates of the food combine with the digestive fluids secreted by the glands and the water we drink, to form glucose ; the proteins of the food, along with water combine with the digestive fluids of the glands to form amino-acids ; similarly the fats are turned into glycerol (along with fatty acids).

Q. 124. What is the function in the human body of :—

(a) The stomach, (b) The small intestine, (c) The large intestine, (d) The liver.

Ans. (a) The stomach produces from its lining gastric juice and mucus. The gastric juice breaks the molecules of proteins in the food to smaller, though quite large molecules of soluble substances known as peptones. The food is also churned in the stomach for about two to five hours and reduced to a liquid pulp and made most easy to be further acted upon by other parts of the alimentary canal.

(b) It is in the small intestine that most of the process of food digestion takes place. The wall of the small intestine pours out an alkaline liquid containing many enzymes. The small intestine also receives charges of the pancreas which contain many enzymes ; it also receives the bile of the waste products of the liver as also helps in digestion of the various fats. The

enzymes of both the intestinal and pancreatic juices reduce the undigested starches, proteins and fats into simple soluble substances—the glucose, amino-acids and sugars etc. which dissolve in the water. As it goes on churning the food, it also goes on absorbing it through small tubules called villi, which pour the rich contents of the food absorbed into the blood stream.

(c) The large intestine does not do the work of digestion. It simply recovers the water of the digested food and the remaining useless matter into a solid mass to throw it into the rectum to be expelled out by voluntary muscular action.

(d) The function of the liver is to separate the impurities from the venous blood, and to manufacture the bile which it pours into the small intestine to help in the digestive process. It also stores the glucose for human energy.

Q. 125. In the human body what organs perceive ?—

(a) Pain (b) heat and cold (c) pressure (d) position and motion of head (e) light touch.

Ans. In the human body (a) pain is perceived by the nerve fibres in the deeper layers of the skin ; (b) heat and cold by the nerve endings in the skin ; (c) pressure by the pacinian corpuscles in the skin ; (d) position and motion of the head by the labyrinth of the ears ; (e) light touch by the Meissner's corpuscles in the skin.

Q. 126. (a) When you spin round you feel giddy. What is this due to ?

(b) Why has nature provided man two eyes instead of one ?

(c) What function does the spinal chord perform in the human body ?

(d) What parts of the human brain control the following functions ? :—

(i) Respiration (ii) Our skilled movements like cycling and making a fine earthen pot (iii) The action of the heart (iv) The maintenance of posture and balance (v) Regulation of temperature (vi) Thought (vii) Our instinctive bodily actions.

(e) When a dog pants, does it cool or warm itself ? Explain the reasons of your conclusion.

In what respects is the feeding of infants with cow's milk inferior to breast feeding ?

Ans. (a) This happens to us because the fluid in the labyrinth of the ear also rotates with us with great speed. Even when we come to stand still this fluid goes on rotating or remains greatly disturbed. It violently stimulates the nervous system, specially the

muscles which regulate our posture, the result is that we lose our equilibrium and feel giddy and unbalanced.

(b) If one eye is lost, the other will serve us. It is better to have one than being totally blind. One-eyed people cannot judge distances as accurately as the two-eyed. As has been aptly said "a one eyed person often pours the tea behind or in front of the cup!"

Moreover, sight with two eyes gives a solid effect. The right eye sees a little more of the right side of an object and the left eye sees a little more of the left side.

(c) The spinal chord transmits impulses to the brain and operates simple reflexes.

(d) Respiration, action of the heart and regulation of temperature is done by the brain-stem and the nervous system attached to it; the maintenance of posture and balance and body's instinctive actions are done by the cerebellum; thought, and regulation of skilled labour or movement are the function of the cerebrum.

(e) The dog cools itself, as by so doing it evaporates moisture from its lungs.

(f) Milk from the mother's breast is better than the cow's milk to an infant for the following reasons :—

(1) The mother's milk is entirely free from germs. Ordinary milk, unless it is specially sterilized, may swarm with lactic bacilli, as also with the germs of bovine tuberculosis and other germs that the *gowala* may introduce while milking and handling it.

(2) Maternal milk carries with it anti-bodies which kill germs and therefore confers immunity to the child from infection.

(3) Mother's milk is so diluted and adjusted by nature that it is fit for a just born child. Cow's or any other milk is, what we may call "heavy" for the child. It cannot digest it.

Q. 127. (a) Which of these are mammals, birds, fish, reptiles, amphibians :

(b) Whale, toad, shark, lizard, tortoise, kangaroo, ostrich, newt, pike, duck, penguin, herring, dog, crocodile.

(b) Have fish a sense of smell and hearing ?

(c) Which of these can swim :—

penguin, water, snake, newt.

(d) Why does a person suffering from diabetes pass sugar in his urine ?

Ans. (a) Dog, whale and kangaroo are mammals; duck, ostrich and penguin are birds; lizard, tortoise and crocodile are

reptiles ; toad and newt are amphibians ; pike, shark and herring are fish.

(b) Fish have both a sense of smell and hearing, though probably not much developed.

(c) All the three can swim.

(d) This is because the pancreas of the diabetic patient produce little or no insulin, hence the glucose from his food is not turned into glycogen, but accumulates in his blood, till his kidneys remove it. Hence the urea of a diabetic patient always contains sugar unless he takes regular injection of insulin.

Q. 128. How and from what sources are the following prepared and to what uses they put ?

(1) Alcohol (2) Asbestos (3) Asphalt (4) Catgut (5) Fuller's earth (6) Gutta-percha (7) Gelatine (8) Nylon (9) Turpentine (10) Saccharine (11) Artificial Silk (12) Bakelite (13) Beer (14) Copal (15) Gun metal (16) Paper.

Ans (1) **Alcohol** is produced by the direct fermentation of the sugar by yeasts of the starch of grain which is converted into sugar by melting and then the sugar is fermented into alcohol by yeast.

Alcohol is chiefly used as an intoxicating drink, also as a solvent for gums and resin, for making quick drying varnishes, in the making of dyes, for essential oil in perfumery, and for medical substances in pharmacy. It is also used in the manufacture of chloroform and iodoform etc.

(2) **Asbestos** is a fibrous mineral which is mined in Canada, Rhodesia, Corsica, Hungary, Russia, Cyprus etc. On account of its poor conductivity and non-inflammability it is mostly used as a fire-proof material. Thus it is made into fireproof garments for firemen's gloves for furnacemen, for lagging steampipes and boilers, for fire-proof almirahs and for motor car brakes and clutches.

(3) **Asphalt** is a naturally occurring bitumen and also as the bitumen left by the distillation of deposits of petroleum. It is used for metaling road surfaces, damp courses and as an ingredient of enamels.

(4) **Catgut.** Catgut is the cord prepared from the intestines of horses, sheep and other animals, used for the strings of musical instruments, tennis rackets and by surgeons for stitching wounds.

(5) **Fuller's earth.** A kind of fine soft clay, possessing highly absorbent qualities obtained from the oolite and chalk systems, used for cleaning and felting cloth and wool.

(6) **Gutta-percha.** Gutta-percha is the hardened juice of a family of tropical plants mostly found in Malaya. Its chief use is

as an insulator specially for cables ; also in making hose, belting and other flexible goods.

(7) **Gelatine** Gelatine is obtained from animal membrane, bone, tendons and other animal tissues. It is used for making food jellies, confectionery and other foodstuffs ; also for photographic materials. The coarser qualities are used for preparing glue.

(8) **Nylon**. It is a synthetic chemical compound from which textile fabrics are prepared.

(9) **Turpentine**. A mixture of resin and oil obtained by distillation from the sap of pines and conifers. It is used as a dilutent of paint and in varnish ; also medicine as an irritant.

(10) **Saccharine** It is prepared from toluene. It is used as a sweetening agent and by diabetic patients who are forbidden to take sugar. As it is said to be 500 times sweeter, weight for weight, than cane sugar, an extremely small quantity serves the purpose. It is also used as a substitute to sweeten mineral waters.

(11) **Artificial Silk**, also called rayon, is prepared chemically from wood pulp or cotton cellulose. The fluid is subjected to mechanical reproduction of the silkworm's movements. It is of course used as a substitute for silk.

(12) **Bakelite**. It is a compound of formaldehyde and phenol used as a substitute for wood in many articles of furniture, celluloid and amber.

(13) **Beer** is prepared by fermentation of malted barley and hops. It is extensively used as an intoxicant liquor.

(14) **Copal** is a resinous substance exuded from some tropical trees. It is largely used in the manufacture of varnish.

(15) **Gun-metal** is an alloy of copper and tin in the proportion of nine parts of copper to one part of tin. It is used for castings.

(16) **Paper** is prepared from wood pulp, linen and rags, grasses, bamboos etc. The pulp is prepared in a series of formidable machines, and is run off through heated rollers in continuous sheets. The sizing is done at the pulp stage. Different kinds of papers are prepared by special process from special materials according to the use to which they are to be put. Thus art paper requires special machinery and processes and materials, different from that required for newsprint, antique etc. Paper is being used for every conceivable purpose, from being used for books, periodicals, newspapers, packing and as writing paper, for kites and what not.

Q. 129. State who

(1) Was the founder of Homœopathy,

- (2) Perfected the system of reading and writing for the blind.
- (3) Invented the shorthand system of writing,
- (4) Founded "The Red Cross,"
- (5) Discovered the Laws of Gravitation,
- (6) Was the first to reach the North Pole,
- (7) Introduced chloroform as an anaesthetic,
- (8) Is known for his grafting of animal glands on the human body to rejuvenate it,
- (9) Discovered bacilli of cholera and phthisis and invented the tuberculin test for animals,
- (10) Discovered that anopheles mosquitoes carry the malarial parasite,
- (11) Invented the telephone,
- (12) Introduced antiseptic surgery ?

Ans. (1) Samuel Hahneman (2) Lewis Braille (3) Sir Issac Pitman (4) Henri Dunant (5) Sir Issac Newton (6) Robert Peary (7) Sir James Simpson (8) Sergie Voronoff (9) Robert Koch (10) Sir Ronald Ross (11) Alexander Graham Bell (12) Lord Lister.

Q. 130. Answer the following :—

(a) Why do we yawn when tired ?

(b) At what temperature :—

Alcohol freezes,

Lead melts,

Iron boils ?

(c) What is the approximate temperature of a Tungsten Lamp Filament.

(d) What is the diameter of the sun ? How many times it is that of the earth ?

(e) Is there any method for measuring the weight of the sun ? How many times is the sun heavier than the earth, if the earth's weight is taken as a unit ?

(f) Does the sun rotate like the earth ?

(g) What do you understand by a sunspot ? What is the conjecture about the formation of the sunspots ?

(h) Scientists have calculated that the sun has been radiating heat and light for some 2,000,000 years, and yet it has got little hotter or cooler. What is the latest theory that accounts for this ?

(i) What are comets and what do you know of their movements? Name some of the great observatories of the world.

(k) Name the brightest fixed star in the heavens and its approximate distance from the earth.

(l) What are trilobites? When did they live? What are their nearest modern representatives?

(n) What are the amphibians? Name at least three of them?

Ans (a) Because of the lack of sufficient oxygen in the lungs, we take long and deep breathing to bring in fresh air and give the lung the oxygen they require.

(b) Alcohol freezes at -118° Centigrade or -180° Fahrenheit; Lead melts at 327° Centigrade or 621° Fahrenheit, Iron boils at 2400° Centigrade or 4350° Fahrenheit.

(e) The approximate temperature of a Tungsten Lamp Filament is 2500° Centigrade or 4352° Fahrenheit.

(d) The diameter of the sun is 864,000 miles. This is about 109 times the diameter of the earth.

(e) "We can weigh the sun because we know that its pull on the earth exactly balances the tendency of the latter to fly out of its orbit. The force required to keep the earth moving in the circular orbit with a steady speed is given by multiplying its mass by the square of its velocity and dividing by the radius of the orbit. This force must equal the gravitational attraction between the masses of the earth and sun."

It has been calculated that the sun is 330,000 times heavier than the earth.

(f) Yes. The sun rotates like the earth. We know this because spots are often seen on the surface. It appears to rotate in a period of about a month's time.

(g) Sunspots are patches on the sun's surface which appear to have a darker centre and a light band of shadow round them.

The sunspots are supposed to be gigantic storms like those on the earth but of vastly greater proportion. When a gas has its pressure lowered, it becomes cooler—this accounts for the darker centre.

(h) It is supposed that the interior of the sun matter is being turned into energy. Hydrogen of the interior of the sun is being changed into a smaller mass of other elements and the mass which is lost is being turned into energy.

Now the sun is so vast that even in a thousand million years the mass lost which gives the energy is but a fraction of the total

mass of the sun hence the sun gets little hotter or cooler even over a stretch of millions of years.

(i) Comets are heavenly bodies of a luminous and nebulous appearance which move round the sun in orbits which are usually elongated ellipses. The comets consist of three parts :

1. The nucleus or head, 2. the coma which surrounds the nucleus and is of gaseous matter and 3. The tail which may extend for millions of miles and consists of small dust-like particles carried away from the nucleus by the gases in the coma.

The comets which reappear at intervals move in an ellipse, but there are others which never reappear. They must be moving in parabolic orbits.

The most well known comets are (1) Hailey (2) Enake (3) Pons Winnecka.

(j) The most important of world's astronomical observatories are :—Modern Observatory France, Pulkova Observatory Russia, Royal Observatory Greenwich, England ; Yerks Observatory of the University ; of Chicago ; Lick Observatory of the University of California at Mount Hamilton.

(k) Sirius is the brightest of all stars. It is 5,000,000 times farther away than is the sun from us, when we have to remember that the sun is 92,800,000 miles from the earth.

Q. 131. (a) What do you understand by 'Adaptation.' ? Give three or four examples of such 'Adaptation'.

(b) What is aestivation ?

(c) What is Ambergis ? What is it used for ?

(d) What is a thermionic valve ? Where is it used ? What are its essential parts ?

(e) Name some well known anaesthetics. Which of them are used for long and which for short operations ? State how an anaesthetic is administered for a long operation ?

(f) Name the unit used by the physicists to measure wave-lengths.

(g) What is called the process used to make substances less brittle ? Where is it applied ?

(h) How is artificial rain produced ?

(i) What is the average pressure of the atmosphere at sea level ?

(j) State how atomic energy is obtained ?

(k) What is the apparatus used for the observation of under water life at great lengths called ?

(j) Who is a 'blue Baby' ? Why is one so called ?

(m) What is a catalyst ? Name some of the catalysts you know of.

(n) Name some of the most important products obtained from coal tar. What are those products used for ?

Ans. (a) Fundamental characteristic of all living matter is to adjust or adapt itself to the conditions in which it lives and so assist its survival in the struggle for existence. Thus an animal's shape, its organs, and its behaviour are such as will enable it to survive and breed in the circumstances in which it lives.

Numerous examples of adaptation can be given. Thus the bones of a bird are of low specific gravity, for most of the long bones contain air sacs which communicate with the lungs. This feature makes it easier for the bird to remain in the air, and secondly it forms a reservoir of air so that there is plenty of oxygen available for the rapid liberation of energy, necessary for a creature leading such an active life.

The body of a bird is streamlined, rounded and gradually tapering to a tail. This feature tends to lessen air resistance. The long neck of giraffe and of the camel enable these animals to feed on the leaves of tall trees. The big cushioned feet of the camel enable it to go on with ease over slippery sand. The leafless cactus exists in nearly waterless conditions and is adapted to its surroundings.

(b) Aestivation is the condition of hibernation which some animals experience during dry and hot seasons. It is usually applied to reptiles and fishes who burrow in the mud and hibernate during the dry season.

(c) Ambergis is a sweet smelling fatty substance found in the intestines of the sperm whale, used in perfumery and as a flavouring substance.

(d) "The Thermionic valve is an electronic device, being a fundamentally important valve in radio. It consists of a vacuum tube containing practically no air, and having a heated filament as cathode, emitting electrons collected by a metal plate (the anode) whose flow is controlled by intervening wire mesh electrodes called grids."

The valve serves the purpose of an amplifier.

(e) Some well known anaesthetics are :—

Ether, chloroform, laughing gas, cocaine, procaine, cyclopropane, barbiturates etc.

For short operations, ether, laughing gas, solutions of barbiturates are given.

For long operation chloroform or procaine is administered. When a long and difficult operation is to be performed the patient is administered chloroform which he is made to inhale, but for special parts to be operated upon cocaine is used for the eye, while procaine is used by injection into parts to be operated on, or into nerves, or into the spaces round the spinal chord. This makes that part insensible to pain while the patient is quite conscious and may even see the operation being performed on him if he is stout of heart and does not faint.

(f) This is called the Angstrom unit. It is used by physicists to measure wave-lengths of light. In this measure an Angstrom unit is one ten thousandth of a micron—micron being one millionth of a metre.

(g) Annealing. The purposes of the process are either to soften or refine the substance, or give greater stability to its composition and power to withstand stress or if it is an alloy, to bring about a better mixture of the constituents of the alloy.

(h) Artificial rain can be produced either by :—

- (i) Bombarding a cloud from above with dry ice pallets or
- (ii) saturating a cloud from below with silver iodide smoke or
- (iii) injecting a cloud from below with water droplets.

(j) Atomic energy is obtained from fission of the atomic nuclei under certain suitable conditions. The nuclei of certain radio-active substances, such as uranium isotope (called uranium 235) splits up into two equal parts when bombarded by neutrons. This is the atomic fission. On this fission the uranium nucleus gives out more than one neutron, though only one neutron is needed to produce the fission. This fact means that a chain reaction has started. Every time the fission takes place, energy is liberated in the form of heat and radiation. This is the "atomic energy".

(k) The apparatus is called the Bathysphere.

(l) A baby born with a defective heart so that its pumping action is poor and for that reason insufficient blood passes to the lungs to receive oxygen is called a 'blue baby'.

(m) A catalyst is a substance that alters the speed of a chemical reaction, but itself remains unchanged in the process. Some well known catalysts are manganese dioxide, ferric oxide, a certain preparation of vanadium, etc.

(n) Most important products obtained from coal-tar are :—

(1) Benzene and toluene used as motor spirit and for making dyes, drugs, plastics, synthetic fibres, insecticides etc.

(2) Phenol or carbolic acid, the starting point of material for many plastics, dyes, pharmaceutical products, perfumes, drugs etc.

(3) Creosote for preserving wood and making disinfectants.

(4) Naphthalene for paints, dyes and insecticides.

(5) Anthracene for dyes and drugs.

(6) Pitch for road making.

(o) Chemicals used for killing germs are called germicides.

Most important of these are :—

Carbolic acid, boric acid, iodine, hydrogen peroxide and silver nitrate.

Q. 132. What is (a) Diffraction (b) a Dynamometer (c) Farad (d) The Fleming's Rule (e) The Fourth Dimension according to Einstein (f) Genetics (g) The Haber Process (h) Heavy water (i) Isomerism (j) An isotope (k) A manometer.

Ans. (a) When light passes through a narrow slit, or over the edge of an opaque body, a pattern of light and dark or coloured bands is produced. This phenomenon is known as diffraction and is due to the light waves bending and spreading out from their path.

(b) The Dynamometer is an apparatus for the measurement of work generated by motors and engines.

(c) The farad is the unit of electrical capacity. A capacity of 1 farad requires 1 coulomb of electricity to raise its potential 1 volt; or more simply it may be defined as the rise in potential of one volt by the addition of one coulomb.

(d) The Fleming's Rule is rule of using the hand to find the direction in which a current flows in a generator (called the right hand rule) and the direction in which an electric motor revolves (called the left hand rule). According to the well known left hand rule if we extend the fore finger, the middle finger and the thumb of the left hand so that they are mutually perpendicular to each other and the fore finger points in the direction of the magnetic field, the middle finger in the direction of the electric current, then the thumb will point in the direction of the motion of the conductor.

(e) The fourth dimension according to Einstein is the dimension of time, which is regarded as necessary to any objective measurement of physical events and cannot therefore be separated from the usual dimensions of space, i. e., height, length and breadth.

(f) Genetics is the science which is concerned with the study of the inborn properties and the inborn differences which determine heredity.

(g) The Haber Process is a synthetic method discovered by a German Scientist for the manufacture of ammonia on a large scale from atmospheric nitrogen. In its essentials it consists of heating under pressure a mixture of nitrogen and hydrogen in the presence of a catalyst.

(h) Heavy water is the popular name for deuterium oxide, D_2O , which occurs in proportion of 1 to 5,000 in natural water and is used as a moderator in atomic plant.

(i) Isomerism is the phenomenon of chemical compounds having the same molecular formula but different properties. Thus butane and isobutane have both the formula C_4H_{10} , but they have different properties. This is due to the different arrangement of the atoms in their molecules.

(j) Isotopes are substances with identical chemical properties but different atomic weights. Thus there are 8 isotopes of lead, all with 82 electrons and 82 protons, but each has a different number of neutrons.

(k) A manometer is an instrument for measuring the pressure of a gas, vapour or liquid. It is usually a U tube holding a liquid.

Q. 133. (a) What is glycerine? How is it obtained? To what uses is it put?

(b) What is mineral wool? What is it used for?

(c) To what uses are put : (i) Rubber (ii) Saccharine (iii) Sal-ammoniac (iv) Sal-volatile (v) Shellac (vi) Silver Bromide (vii) Slaked lime (viii) Stainless steel (ix) A Thermopile (x) Phosphates (xi) Polarized Light (xii) Dry Ice.

(d) What important chemical substances are made from salt?

(e) What important functions does the skin perform which are essential to life?

Ans. (a) Glycerine is a sweet syrup, being a by-product of soap manufacture and in the manufacture of stearic acid for candles. The most important use to which it is put is in preparing the explosive nitro-glycerine, also in food and in medicinal products, cosmetics, adhesives and inks.

(b) It is a wool-like material made by subjecting a molten mixture of clay, limestone, magnesium, limestone and fluorspar to a blast of superheated steam. Used as a fireproof, as an insulator or for sound deadening.

(c) (i) Rubber is used for making of tyres, elastic, waterproofing, soles and heels for shoes, cable sheathing, wire covering, flooring, proofing of clothes, upholstery material, pipes. It is now also being used in bullet proof tyres, flame-proof hose, in the barrage balloon manufacture etc.

(ii) Saccharin has as yet found use only as a substitute for sugar in drinks and foodstuffs.

(iii) Sal-ammoniac is used in the composition of electric batteries, in the leather and textile industries and for galvanizing.

(iv) Sal-volatile is used to administer to patients as a remedy for faintness (as smelling salts).

(v) Shellac is used in varnishes, in the manufacture of gramophone records, as a protective coating, in adhesives, electrical insulation.

(vi) It is used in the preparation of sensitive emulsion for photographic plates and films.

(vii) Slaked lime is used extensively in agriculture, in tanning and in chemical manufacture. Also for making mortar, cement and concrete. Slaked lime as lime water is used as a test for carbon dioxide, giving a white precipitate of chalk.

(viii) Stainless steel is much used in modern clocks, as its co-efficient of expansion is only $\cdot 000001$ at ordinary temperature. It is also extensively used in domestic equipment, such as sinks, kitchen accessories, and cutlery, also for making chemical plant, and vital parts of machinery which have to resist any corrosive and abrasive action. Ordinary steel is given, by the Gordon process, a coating of stainless steel which makes the whole absolutely rustless.

(ix) A thermopile is used for the measurement of heat where thermometers cannot be employed.

(x) Phosphates are extensively used as fertilizers in agriculture and horticulture.

(xi) Polarised light is employed in the identification of minerals, the estimation of the strength of sugar and solutions, in cinematography and the detection of strains in transparent materials.

(xii) Dry ice is used in refrigerators and for artificially stimulating rainfall.

(d) Most important chemicals derived from salt are : Soda ash, bicarbonate of soda, caustic soda, chlorine, sodium metal and calcium chloride.

(e) "The skin performs many functions essential to life, including the maintenance of even body temperature, the elimination of waste products, and the destruction of invading microbes. Pigments on the skin protect the body from harmful effects of the sun.

Q. 134. Which of these foods supply you (1) mainly Calories (2) First class protein (3) Calcium (4) Iron (5) Iodine (6) Vitamins A, B, C and D.

Potatoes, fruits, milk, green leafy vegetables, meat, fat, fish, eggs, margarine, sugars, cereals, pulses, nuts, poultry, beverages, condiments, milk products, liver, citrus, turnips, raddish.

Ans. Of the food mentioned :

1. *Calories are mainly supplied by fat, margarine, sugar, cereals, pulses, nuts, potatoes.*

2. *First class protein by milk, milk products, meat, fish, eggs, poultry..*

3. *Calcium by milk and milk products.*

4. *Iron by eggs, meat, liver, green leafy vegetables.*

5. *Iodine by fish.*

6. *Vitamin A by milk, green vegetables, eggs and fats.*

Vitamin B by cereals, nuts, green vegetables, eggs, milk, meat and fruits.

Vitamin C by citrus, green vegetables, turnips, raddishes.

Vitamin D by milk, fat, fish and eggs. Condiments and beverages add nothing to above.

Q. 135. (i) For the following products man had to depend on nature. Some of them have now been produced artificially. Write down those that can be produced artificially :

mica, jute, wood, wool, silk, indigo, kerosene, rubber, diamond.

(ii) **What is the recently discovered drug that is a cure for typhoid ?**

(iii) **Why is the camel the principal means of transport in a desert ?**

(iv) **What makes the sea roar ?**

(v) **What is hydrogenation of oil ?**

(vi) **How is it possible for a submarine to disappear below the surface of water and rise up again ?**

(vii) **By the help of which devices can the seaman inside a submerged submarine observe objects floating on the surface of an ocean, and also breathe in it for a long period ?**

(viii) **Why is chlorine added to drinking water ?**

Ans. (i) Silk, indigo, rubber, diamond.

(ii) Chloro-amphenicol ; also chloromycetin.

(iii) Because the camel has large padded feet which do not get stuck in sand, but enable it to walk smoothly and swiftly on it. No other animal has such feet adapted to walk on the sands of a desert.

(iv) It is due to cyclones when large masses of water are rolled about, but more so during the high tides (called spring tides) due to the gravitational pull of the sun and the moon on the waters of the oceans.

(v) This term means treatment of vegetable oils with hydrogen in the presence of a catalyst, at high temperature under pressure. It then forms a product resembling a solid animal fat.

(vi) The modern submarine is provided with large ballast tanks in the bow, in the middle, as also in its sterns into which water is admitted through valves, which are opened when it is required to be submerged. The ballast tanks are of such a size that, when full, the average density of the ship is only slightly greater than that of the surrounding water. In this manner the tanks get filled in a minute or two and the submarine gets submerged. When the submarine is to be raised to the surface of water, the water is pumped out of the tanks and discharged outside into the sea and it slowly comes to the surface.

(vii) With the help of its periscope the men in the submerged submarine observe moving objects floating on the surface of the ocean.

The modern device for enabling men to breathe inside the submerged submarine is what is called a "schorkel" This is a tube raised above the surface of the surrounding water which contains both an inlet and exhaust pipe running side by side. These pipes enable the engines working inside to draw air into the submarine both for the men and for driving the charging engines and for the exhaust gases to escape.

[Note. It is so short in length that even a radar cannot detect it.]

(viii) To act as a germicide for killing bacteria in the drinking water.

Q 136. What is the difference between ?—

(i) Artery and Vein.

(ii) Hard water and soft water.

(iii) Caustic soda and washing soda.

- (iv) Steam engine and steam turbine.
- (v) Inoculation and vaccination.
- (vi) Product and by-product.
- (vii) Automobile and automation.
- (viii) Glider and helicopter.
- (ix) Star and planet.
- (x) Density and specific gravity.

Ans. (i) An artery is an elastic blood tube that carries blood from the heart to various parts of the body.

A vein is a blood vessel in which blood runs in the opposite direction. It collects impure blood from the capillaries in the tissues and carries it back to the heart.

(ii) Water is said to be hard when it will not easily lather with soap. This hardness is due to the presence in water of salts of calcium or magnesium. In such a water soap forms what are called 'curds'.

Water in which soap easily forms a lather is soft water.

(iii) Caustic soda is sodium hydroxide, with the formula NaOH . It is a white crystalline solid that has a burning (or caustic) action on flesh and it rapidly becomes liquid by the absorption of atmospheric moisture.

Washing soda is sodium carbonate decahydrate with formula $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$. It is a white crystalline solid like caustic soda, but unlike caustic soda it loses nearly nine-tenths of its water on exposure to dry air, becoming a white powdery carbonate.

Its alkalinity is also less pronounced than that of caustic soda.

(iv) A steam engine is a machine of a cylinder and piston type, in which steam at high pressure flows from a boiler into a cylinder containing a movable piston. Mechanical power is derived from the to and forth movement of the piston in the cylinder by the alternate supply and cutting off of steam to it.

In the steam turbine, steam from a boiler under great pressure is jetted on to the freely rotating blades fixed to the outer surface of a drum; the energy of the escaping steam causing the drum and its blades to rotate.

Thus whereas in the steam engine the mechanical work is done by the to and fro movement of the piston which move the cylinder, in the steam turbine it is done by the rotating blades on which the jet of steam is directed.

(v) Inoculation is the introduction of living disease germs into the body of a human being or an animal by hypodermic injection (i.e. by the puncture of the skin by needle containing the liquid with the germs in it). This gives the subject a mild attack of the disease which prevents his being subsequently liable to the attack of the severe one.

In vaccination a preparation of dead bacteria of the variety responsible for the disease is introduced into the blood stream of the patient in order to increase his resistance to the disease.

The chief difference in the two processes thus lies in the first case using a mild culture of the disease germs themselves, whereas in the second the culture is that of dead bacteria of the disease.

(vi) Product is the article derived directly from a chemical or manufacturing process; a by-product is an article of commerce produced in the process of manufacturing the main article. Formerly the by-product was only a waste product, but now such ones are being put to use and some time even exceed in utility the originally intended product. Thus tar is the by-product in the destructive distillation at high temperature of wood, shale and coal. The products to be sought to be manufactured are coal gas, coke or charcoal, and the tar produced in this manufacturing process is thus a by-product.

(vii) An automobile is a self-propelled vehicle like a petrol-driven motor car.

An automation is a mechanical contrivance, which when set in motion reproduces the movements of man or animal.

(viii) A glider is an aeroplane unprovided with propeller or engine. It is able to move in air by means of ascending currents of air in any direction though most usually in the direction of the moving current. In it one has to have a slow descent from a high taking off ground and then take advantage of ascending current of air.

A helicopter is an aeroplane which is provided with one or more mechanically driven lifting propellers, which rotate horizontally and lift the aeroplane upward.

So the first depends only on movements of the air and has no mechanically driven propeller or machine etc.; the second cannot rise up without the help of a petrol driven machine.

(ix) A star is a self-luminous body like our sun, consisting of a globular mass of intensely hot gases.

A planet is a globular body revolving like our earth—which is a planet—round the sun. It has no luminosity of its own, but shines by the reflected light of the sun.

(x) Density means the mass per unit volume of a substance. It is brought into relation by comparison with a standard like water

in the case of liquids, hydrogen in the case of gases.

Specific gravity is the ratio of the weight of a given volume of a substance to the weight of the same volume of a standard substance (water in the case of liquids, hydrogen in the case of gases as stated above):

The idea about density and specific gravity may be clear from examples given below.

Water at 4° C is denser than at other temperatures. At 0°C when it becomes ice, it begins to float over water because then it is much less denser than the water over which it floats. Similarly gases are much less denser than liquids, while water is much less denser than mercury.

Specific gravity is the ratio of the densities of two substances of equal volume. Thus it is a sort of relative density. Thus as the density of lead is about 700 lbs. per cubic ft., and that of cold water is 62.4 lbs. per cubic ft., the specific gravity of lead is

$$\frac{700}{62.4} = 11.2.$$

Q. 137. (i) What is an antibiotic? Name some of the most important antibiotics?

(ii) What is penicillin and what is its use? Who invented it?

(iii) What is insulin? What is its use? Who invented it? Where from is it derived?

(iv) What do you mean by the term "fixation of nitrogen"? Name the process by which it is obtained.

(v) What is lymph? What is its function?

(vi) What do you understand by a respiratory organ? What function does a respiratory organ perform?

(vii) Why, while watching a cricket match, do we see the ball strike a moment before we hear the sound of the bat hitting the ball?

(viii) Why does a ship made of heavy plates of steel and containing heavy engines, cargo and a large number of men in it float on the water of the ocean which is much less denser than steel?

(ix) Which fall down faster in a vacuum: a feather, a wooden ball, a ball of steel?

(x) Why do water pipes often burst in winter?

Ans. (i) Antibiotics are substances obtained from living organism which inhibit (i.e., retard) the growth of or destroy certain micro-organisms. They are used as drugs in the treatment of human diseases. Most well known of the antibiotics are: Penicillin, streptomycin, chloromycetin, aureomycin.

(ii) Pencillin is an antibiotic secreted by certain strains of mold (*Pencillin notatum*). It was discovered by Sir Alexander Fleming.

It is used in the treatment of pneumonia, meningitis, bone infections, syphilis, gonorrhea, heart diseases which are of infectious origin, scarlet fever, boils, abscesses and anthrax.

(iii) Insulin is a hormone derived from the Islands of Langerhans in the organ pancreas. It is used in the treatment of diabetes to maintain the body's power to utilize sugar. It was first prepared by Banting and Best.

(iv) By the term 'fixation of nitrogen' we mean the conversion of atmospheric nitrogen into nitrogenous compounds. This is done by the Haber process for obtaining ammonia.

Certain bacteria in the soil help in the process of fixation of nitrogen and this is utilized by plants as a nitrogenous manure or fertilizer.

(v) Lymph is a transparent alkaline watery fluid found in the tissues of human beings and animals. It is diffused from blood in the capillaries surrounding the tissues.

Its main function is (1) to convey nutritive matter for blood formation and for supplying the body cells with nutrition and (2) waste matter from the tissues into the blood stream.

(vi) By a respiratory organ we mean an organ in a living body which helps in the process of breathing, in which oxygen is taken into the blood stream through the lungs while carbon dioxide is expelled out.

The lung is the main organ that helps in this process.

(vii) This is due to the fact that light has a far greater speed than sound. We see the bat striking the ball in the flash of a second, but as sound travels at a much less speed than light, the sound of the striking is heard only after the striking of the ball is seen.

(viii) This is because volume for volume the total weight of the ship is less than the weight of the water it displaces and hence the ship floats. The ship acts like a hollow vessel which can float on water and not like a solid ball which sinks at once because it displaces a very small amount of water, whose weight is less than that of the ball.

(ix) All together ; because in a vacuum there is nothing to retard any one's downward motion.

(x) Because due to the outside cold, water in the pipe becomes solid ice. In becoming solid ice water expands and this force of expansion is sometimes so great on the sides of the pipe as to cause it to burst.

Q. 138. (i) Both typhoid and tuberculosis are contagious diseases. But a typhoid patient may be kept at home and nursed and a tuberculosis patient has to be sent to a hospital. Why?

(ii) What is immunity? How is it acquired?

(iii) What is a blood bank? To what uses is it put?

(iv) In the arctic and antarctic regions, the temperature touches freezing point and is often very much lower, but the fish in those regions never get frozen. Why?

(v) What are cold blooded and warm blooded animals? Give examples.

(vi) What is the purest form of water in nature?

(vii) How would you give gold coating to a silver cup by using an electric current?

Ans. (i) The sputum of a patient suffering from typhoid fever can be thrown into a basket containing dust or earth and this can be destroyed. The patient does not exhale the typhoid bacilli to contaminate the air around him and thus infect those attending upon him. But the patient suffering from T.B. exhales enormous number of the T.B. bacilli and these may infect others and those attending upon the patient may themselves become a prey to T. B. Hence such a patient has to be sent to a hospital and not kept at home.

(ii) **Immunity** means the condition of resistance to a particular disease that a person acquires. This immunity results from antibodies produced in a person's or animal's own tissues, or cells or the body fluid, as a result of:

(1) having had or recovered from the disease, e.g., mumps, scarlet fever.

(2) from the cumulative effect of slight infections in childhood (e. g., mild tuberculosis).

(3) By inoculation, e. g., small-pox.

(4) Injection of the toxin, e. g., diphtheria.

(iii) **Blood bank** is a place where blood is stored under refrigeration (4° to 6° C) with preservatives that contain citric acid, sodium citrate, etc., to prevent coagulation.

The blood so preserved is administered intravenously to patients who may have lost blood through some injury.

(iv) This is due to the fact that water at the surface of ponds, lakes and oceans becomes ice when the temperature reaches 0° C or below, and since ice is lighter, volume for volume, than the water below it, it remains floating on the water and does not sink to the depths below. It thus serves as a cover-

its use as lamp filament is that the wires made of it have a very high tensile strength which most metals do not possess.

(ix) Dark clothes absorb more readily the heat of the surrounding atmosphere than white clothes and as heat is most wanted in cold days, it is wiser to put on black clothes during winter days.

Q. 6. (i) Why is the air near ceiling of a room warmer than the air near the floor ?

(ii) Why is it easier to float on salty water than on fresh water ?

(iii) When iron rusts does its weight increase or decrease ?

(iv) What are isobars and isotherms on a weather map ?

(v) What are the five most abundant elements in the earth's crust ?

(vi) How does the soda straw draw up soda from a glass ?

Ans. (i) Because as air gets warmed up it rises up towards the ceiling while fresh cooler air from outside takes its place near the floor.

(ii) Because salty water is denser than fresh water. It is easier to float on a dense liquid than on one having lesser density. The fresh water has comparatively lesser density than the heavier salty water.

(iii) It becomes heavier on account of the addition of oxygen to it.

(iv) An isobar on a weather map is a line connecting all points, that at a particular time, had the **same atmospheric pressure**.

An isotherm is a line on a weather map connecting points **having the same temperature**. It is drawn to represent the same temperature prevailing over a wide area at a definite time of the average over a specified period.

(v) The five most abundant elements in the earth's crust are (1) Oxygen, (2) Silicon, (3) Aluminum, (4) Iron and (5) Calcium.

(vi) As the man trying to suck the soda water sucks in air from the straw pipe, that creates a vacuum in the pipe. The soda due to the atmospheric pressure on it rises up into the pipe to fill up this vacuum and ultimately reaches the mouth of the sucker.

Q. 141. (i) Why do wet clothes dry slowly on a rainy day ?

(ii) Why does a man feel better on a hot dry day than on a day when the temperature has fallen considerably but it has got very damp ?

(iii) Why is it more difficult to cook on hill stations than on plains ?

(iv) Why is the air removed from the inside of an electric lamp ?

(i) Because on a rainy day, the air contains much more water vapour than on a dry day and therefore the process of evaporation on a rainy day is much slower than on a dry day.

(ii) On a hot dry day a man perspires freely and as the air is dry, this perspiration evaporates quickly from the body, thereby cooling the body by absorbing during the process of evaporation the heat of the body and making the man feel cool.

On a damp day, even though the atmospheric temperature may have gone down, there is no evaporation of the perspiration and consequently no cooling of the body. The atmosphere is felt to be very stuffy and the man feels comparatively discomforted.

(iii) Because the atmospheric pressure on a hill station is much lower than it is on the plains. The lower the atmospheric pressure, the lower is the boiling point of water and hence lesser heat in the liquid. Therefore it is more difficult to cook on a hill station than on the plains.

(iv) That the atmospheric oxygen may not rust the filament.

Q. 142. (i) Why is one's breath visible on a cold day ?

(ii) What would happen if the earth's gravity were to disappear all of a sudden ?

(iii) Why is water used in preference to other liquids in heating rooms and in hot water bottles ?

(iv) Why is it easier to drive a bicycle with inflated tyres, than with uninflated tyres ?

(v) What is the destructive power of (1) Atom bomb (2) Hydrogen bomb due to ?

(vi) Which is the known lightest substance ?

(vii) Which is the hardest substance ?

(viii) How does the fountain pen filler draw up ink ?

(ix) Why do dirty clothes become cleaner when put in hot water with washing soda ?

Ans. (i) The breath exhaled by us consists of carbon dioxide gas and warm moisture. On a cold day the warm moist-

ture of the breath becomes a sort of mist due to its sudden cooling by the cool atmosphere outside. Hence on a cold day the breath becomes visible as it is exhaled out.

(ii) This is because the heat capacity of water is far greater than most liquids and solids. Thus it has been estimated that the heat capacity of water is nine times that of iron.

Water absorbs heat very slowly and gives it out equally slowly. It also absorbs the maximum amount of heat for a given quantity of it and consequently gives out the same quantity of heat equally slowly.

It thus proves a best medium for heating rooms and hot water baths, for it does not part with its heat rapidly, which is what is wanted in houses and in hot water bottles.

(iii) Because inflated tyres getting into a perfect circular form present the least surface to the frictional resistance of the road surface than an uninflated tyre due to its flatness. Hence a bicycle with inflated tyres moves more smoothly than one with uninflated tyres.

Also the inflated tyres are more elastic than the uninflated tyres and hence there is smoother running in the former case.

(iv) If gravity were to disappear all of a sudden, things thrown upwards will never come down, since it is the downward pull of gravity that brings a thing, thrown upward, to come downward.

A thing suspended up at a distance will remain suspended at its place even if the cord suspending it were removed, for there will be no force of gravity pulling it downward.

(v) The destructive power of the atom bomb is due to the splitting of the uranium atoms which make up the atom bomb. This splitting generates great amounts of energy, and due to the chain reaction set up in the atoms of the bomb, enormous amount of energy is released which gives the atom bomb its destructive power.

In the hydrogen bomb, enormous amount of energy is released by the coalescing of the hydrogen atoms and this release of energy gives the destructive power to a hydrogen bomb.

(vi) Hydrogen.

(vii) Diamond.

(viii) In the fountain pen there is created a vacuum in the ink tube (which is made of rubber) as the short handle is lifted up. Due to atmospheric pressure the ink in the ink-pot rushes up into the vacuum in the tube and thus the tube of the fountain pen gets filled with ink.

(ix) Hot water loosens the dirt of the cloth. The work of the washing soda is to make water soft, specially if it contains calcium salts. It thereby emulsifies grease and enables dirt to be absorbed in the softened hot water.

Q. 143. (i) What will happen if the force of friction were to disappear altogether ?

(ii) What main purpose is served by a battery in a motor car.

(iii) What is a carburettor in a motor car ?

(iv) How is artificial silk prepared ?

(v) How would you start a fire if you had no matches ?

(vi) Why does water cool more quickly in an earthen pot than in a glass vessel ?

Water in an earthen pot cools more quickly and gets cooler in an earthen pot in Jaipur than in Calcutta, specially when monsoons are blowing over Bengal. Why ?

(vii) Of what is lead pencil made ?

(viii) Why does mercury rise in a barometer ?

(ix) What is the distance of the sun from the earth ? How long does light take to reach from the sun to the earth ? What is the speed of light ?

Ans. (i) A ball rolled on a flat surface will go on rolling indefinitely, because there would be no frictional force to retard its motion.

A man will find it most difficult to walk, since there will be no surface friction on the road to retard and his motion thus steady the movement.

It is the frictional force that keeps a nail driven into wood in its position in the wood. If there was no such friction the nail will get loosened and come out.

(ii) The purpose of the battery is to supply current for firing the ignition mixture in the motor car, so that the petrol vapour supplied by the carburettor in the engine may get ignited and the power created by the burning of petrol vapour may start the car. Next, constant supply of electricity of the battery keeps the ignition mixture burning and thus the car is kept supplied with power for its continuous motion.

(iii) The carburettor is an accessory mechanism in an internal combustion engine which regulates the flow of fuel to the cylinders of the engine, and also prepares fuel for ignition, that is, it vaporises it and mixes it with air.

(iv) It can be produced by putting dry grass or dry cotton in between hard pieces of stone and rubbing them together very vigorously. The heat generated by friction of the stones will burn the cotton fibres when it reaches the ignition point.

It can similarly be produced by very vigorously twirling in a wooden groove a wooden stick with a pointed end. The heat of friction in this case also will be enough to ignite paper or cotton or a fibre that easily catches fire.

(v) The earthen pot has very minute pores in it. The dry moving air around it, coming in contact with the minute droplets in the pores of the pot evaporates those droplets and in this process, the latent heat of evaporation is used up, which thus cools the water in the earthen pot.

In the glass vessel, there are no pores and therefore no such type of evaporation takes place. Hence there is no cooling of water in the glass vessels.

(vi) The climate of Jaipur is hot and dry. The dry air quickly takes off the latent heat of water particles in the pores of the earthen pot and cools it.

The climate of Calcutta is hot and damp. Damp air would not evaporate the water particles in the pores of the earthen pot, as it is already saturated with water particles. Hence as there is no taking away of the latent heat of water from the water particles in the pores of the earthen pot there is consequently no cooling of water.

(vii) Lead pencils are made of graphite which is an allotropic form of carbon.

(viii) On account of the atmospheric pressure on mercury, which forces the latter into the vacuum in the tube.

(ix) Average distance of the sun from the earth is 93,000,000 miles.

It takes about 500 seconds for the light from the sun to reach the earth, which is nearly 8 minutes 20 seconds.

Light travels at the rate of 186,000 miles per second.

Q. 144. (i) What is the function of a radiator in a motor car ?

(ii) What is blood pressure ? What is hypertension ?

(iii) As we travel round the earth westward we have to put back the clock continuously. Why ?

(iv) Why do we prefer to use white clothes in summer ?

(v) Why do electricians wear rubber gloves ?

(vi) What is the importance of the thyroid gland in the body ?

(vii) What role does the pancreas in the human system play ?

(viii) A clock keeping correct time in winter is found to run slow in summer. Why ?

(ix) How is water power converted into electricity ?

(x) What is a thermal power plant ?

Ans. (i) It is part of a cooling system in a motor car. Water is stored in it and this keeps the engine cool.

(ii) By blood pressue we mean pressure of blood on the walls of blood vessels, especially the arteries.

This depends upon heart action, the elasticity of the arteries, the resistance to the passage of blood by capillaries and the volume of flow and viscosity of the blood.

There is the condition of high blood pressure in the blood system of a person if there is less elasticity of the walls of arteries. while capillaries offer greater resistance to the flow of blood and the blood has greater viscosity than in normal condition.

By hypertension is meant high blood pressure due to many types of diseases, for example inflammation of the kidneys.

(iii) This is because the earth revolves round its axis from the east to the west direction. If a place on the earth has 9 A.M., a place 15 degrees longitude west to it lags by one hour. Hence we have to continuously put back the clock to keep right time.

(iv) White clothes do not absorb as much heat rays as do black clothes. They rather reflect them back as much as possible. Hence they do not convey much heat to our bodies and are therefore more comfortable to wear in summer.

(v) Rubber is a bad conductor of electricity. Rubber gloves are worn by electricians that electricity may not pass into their hands and thereby endanger their lives.

(vi) The function of the thyroid gland is to control the rate of metabolism in the body: If it is over active there is much metabolic waste causing loss of weight and increased heart beat and blood pressure. If it is inactive, the body has low temperature, slow pulse and lethargy, falling of hair etc. So a normally working thyroid gland keeps in proper order metabolic processes in the body.

(vii) The pancreas produces a digestive secretion which contains enzymes for the digestion of proteins, fats and carbohydrates in the small intestines. It also discharges the hormone insulin, which is

essential for the utilization of sugar in the blood stream. If the pancreas ceases to produce insulin a person becomes diabetic.

(viii) Because during summer the pendulum of a clock lengthens due to atmospheric heat and its swing thus gets slow in summer.

(ix) Water in a dam has stored up potential energy. It is allowed to flow down the dam through pipes and strike the blades of a turbine. This sets the turbine rotating at a high speed. Cat skin or other similar material is allowed to rub the fast rotating axle of the turbine and this continuous rubbing together of the two produces electricity which is conveyed away by wires and stored.

Water power is thus converted into electricity.

(x) A thermal power plant is a plant in which electricity is produced by the burning of coal. Steam produced by coal works a turbine which as in hydro electric power plant produces electricity.

Q. 145. (i) How would you show whether a yellow metal is gold or brass?

(ii) How would you demonstrate by a single experiment that cane sugar is a carbon compound?

(iii) What is the importance of haemoglobin in our blood?

(iv) What is the difference between epidemic and endemic?

(v) A dynamite cartridge struck in a rock bursts the rock on being fired. How does this happen?

(iv) How would you convert limestone into mortar?

(vii) What is the function of the bladder in the human body?

(viii) What are the chief sources of vitamin A, B, C and D and of what use are they to the human body? What diseases are caused by the deficiency of each one of them?

(ix) Both barometer and thermometer consist of glass tubes and mercury. In what respect do they differ and what is each used for?

(x) What is a dynamo? On what principle does it work?

Ans. (i) One method is to use the goldsmith's stone, and rub the two pieces with the stone. The gold leaves a distinctive yellow colour on the stone which the brass does not possess.

Another method is to weigh equal pieces of the two metals together. Gold piece will be found to be distinctly heavier than brass. If we use the specific gravity method, one with greater specific gravity is gold.

(ii) If we burn a piece of sugar in a closed test tube, containing oxygen, we will find that the charred piece of sugar is carbon and ash while the gas evolved is nothing but carbon dioxide, which we can test by passing it through lime water.

(iii) Haemoglobin performs the important function of carrying oxygen in the blood from the lungs to the tissues of the body.

(iv) Epidemic is a disease which arising suddenly in a community rapidly spreads through its members, often travelling from district to district, until sometime a whole country is involved. It may be due to local or external causes, *e.g.*, imported from foreign countries by travellers going to and fro to these countries.

Endemic is the term applied to a disease which affects the inhabitants of certain countries and localities and arises strictly from local causes. Thus it may be due to neighbouring swamps, bad sanitation, impure water, bad climate etc.

(v) This is because of the rapid and shattering explosion it produces. It is the blast of air that shatters the stones round the dynamite when it is detonated.

(v) Lime stone is mixed first with a quantity of water. The limestone is converted into slaked lime, with much generation of heat. A mixture of limestone to which more water has been added is then mixed with sand in the right proportion required. This is our mortar.

(vi) This is a tough muscular bag into which the ureters bring urine from the kidney. Thus the bladder stores the urine to be discharged at our convenience.

(vii) Vitamin A is contained in whole milk, butter, egg-yolk, fish oil (specially halibut and cod) and spinach. Vitamin A is necessary to growth. It helps keep skin and mucous membranes healthy, which for loss of it would degenerate. It prevents certain eye diseases. It also prevents dryness of the skin and of night blindness. It want often results in paralysis.

Vitamin B is contained in the germ and husks of peas, beans, cereals and nuts and in vegetables, fruits, egg-yolk, milk and meat.

Vitamin B is concerned with maintenance of normal appetite, and good digestion. It is essential to normal growth of young. Its absence causes Beri-beri.

Vitamin C is found in lemons, oranges, tomatoes, raw cabbage and other fruits and vegetables.

Vitamin C prevents scurvy.

Vitamin D is present in fish liver oils, and liver and other fatty foods. It is formed in the living body by the action of sunlight.

Vitamin D prevents rickets.

(x) A barometer consists of a long tube which is inverted vertically over a trough containing mercury. Inside the tube it contains mercury, while above the mercury column is the torricellian vacuum.

The height of the mercury column measures the pressure of the surrounding air. It also shows the condition of the weather. If the mercury column falls, it shows that the air is saturated with watery vapour and rain may fall. If the column of mercury rises, dry weather is expected.

The thermometer is a small graduated tube in which the mercury measures the temperature of our bodies.

(x) A dynamo is an electric machine which converts energy from mechanical to electrical form in compliance with Faraday's fundamental law of electromagnetism.

In simpler words a dynamo is a machine in which electricity is generated by the influence of magnetic fields.

The principle of dynamo may be stated thus :

If a complete loop of wire is placed within the field of a magnet no electric current is produced so long as both the loop and magnet remain at rest. But if either of them moves relative to the other, the magnetic influence exerted upon the loop of wire varies and this variation in intensity of a magnet field produces electric currents in the loop of wire. As the wire moves nearer to or farther from the magnet pole, the magnetic field influencing it increases or decreases and the quicker the rate at which this variation can be produced the greater is the electrical effect within the wire.

Thus by mechanical means, the coil of wire is made to rotate rapidly between the two poles of the magnet and this produces the electricity required. The apparatus thus becomes a simple dynamo.

Q. 146. (i) You are given three glass jars, one containing air, one containing nitrogen and one containing oxygen. What experiments would you carry out to distinguish them?

(ii) How is coal formed in nature? Name three types of coal?

(iii) How does air pressure aid in breathing?

(iv) What is a fossil? State the different ways in which fossils are formed?

(v) What is an earthquake? What causes earthquake? What is the instrument called that measures the duration and intensity of an earthquake?

- (vi) Explain the difference between heat and temperature.
 (vii) What is petroleum ? How is it obtained ?

Ans. (i) If on introducing a lighted candle into each of the jars one after another, we find in one jar, that the candle begins to glow more brilliantly than before, it must contain oxygen ; if in another jar the candle glows as in the atmosphere outside, it must contain air ; if it goes out then that jar must contain nitrogen which does not support combustion.

(ii) Coal, according to scientists was formed by the sinking of thick ancient forests (containing huge trees) beneath the surfaces of lakes and swamps and got covered with mud in course of time, which gradually dried up. The result of three hundred million years or so of pressure and gentle heat from the interior of the earth has converted these plant remains into the black shining substance which we now call coal.

Three types of coal are (1) Lignite, (2) Bitumenous coal (8) Anthracite.

(iii) When we exhale air out, there is caused a partial vacuum in the lungs. To fill this vacuum, the air under atmospheric pressure rushes into the lungs and fills them again. Thus respiration takes place. The muscle walls of the diaphragm at the lower end of the case enclosing the lungs simultaneously contract and force the lungs to discharge the air out which is enclosed in them and thus we are forced to exhale air out. Again, the original process, that is outside air under pressure forcing its way into the lungs is repeated and thus this process of inhaling and exhaling air goes on through life on account of the atmospheric pressure on our respiratory system.

(iv) A fossil is any body—animal or plant—that once existed on this earth and which got buried by some natural causes. In a writer's words 'Fossils are any portion of an animal or vegetable organism, such as shells of molluscs, the skeletons of corals, bones of vertebrate animals, leaves of plants which have undergone a process of putrifaction by pressure and by the complete infiltration of mineral matter'.

(v) Earthquake is trembling or shaking of the earth's surface commonly caused when rock masses slip along a fault. Other causes are violent volcanic activity and the collapse of rocks of caves. Instrument that detects and records the intensity of earthquakes is called a seismograph.

(vi) A carat is a unit of weight for precious stones equal to $\frac{1}{5}$ of a gram. It is also a standard of purity of gold alloys, equal to $\frac{1}{24}$. Thus gold which is absolutely pure is said to be 24 carat gold.

16 carat gold thus means that it is $\frac{16}{24}$ pure, containing $\frac{8}{24}$ part some base metal in it.

(vii) Heat may be described as a form of energy associated with our thermal sense.

Temperature is the amount of measurable heat in an object. Thus an object is said to have a high or low temperature according as it is capable of conveying much or little heat to adjacent objects. Temperature is measured by a thermometer. This measurement is not based on the amount of heat possessed by two bodies but by the sensation of intensity of heat they impart. Thus if the same amount of heat has been imparted to a quantity of water as to the same amount of iron then though the amount of heat possessed by the two is the same, the iron will record a comparatively higher temperature than water.

(vii) Petroleum, also called mineral oil, is a thick greenish brown liquid, which is a complex mixture chiefly of hydrocarbons and other compounds.

It occurs underground in permeable rocks into which it has probably been forced by pressure and accumulates in what are called traps below impervious rock layers. It is thus obtained from wells dug deep into rock strata. Often it is found many thousand feet below the earth's surface and is got by deep costly borings into the impervious rock below under which it is believed to exist.

Q. 147. (i) When you stand at the bottom of a stairway, why do you often feel cooler than when in the same room near the top of the stairway?

(ii) How is the human eye very like a simple camera?

(iii) Why do some objects look green, others black or white?

What are primary colours and what are called complementary colours?

What do you mean by "spectrum"?

(iv) To what uses are put (1) the ultra-violet rays, (3) the x-rays, (3) the infrared rays, (4) the radio waves.

(v) What do you understand by a chain reaction?

(vi) What is the name of the process in which plants use light energy to build up their bodies?

(vii) Explain the part played in the process of digestion by (1) the mouth, (2) the stomach, (3) the liver, (4) the pancreas, (5) the small intestines.

(viii) What are enzymes? What part do they play in digestion?

Ans. (1) This is due to the fact that air in a room getting hot rises to the ceiling while cool air from outside rushes in to take its place. The room near the ceiling will therefore be hotter than near the door at the bottom.

(ii) The camera is a box-having a lens and focussing apparatus near its opening and a sensitive plate in the box at the opposite side of this opening. A cap or shutter is fitted to the lens to regulate exposure and the quantity of light to be admitted in.

The eye in main outline is similar in construction to the camera described above. Like the box of a camera it is also a box though globular. Just as the camera has an opening to let in light rays, so has the eye an opening called the pupil which is a round hole in the middle of the iris (which is the adjustable wall of the eye, like the adjustable wall of the camera to regulate light coming into the camera). Also just as the cap or shutter regulates the flow of light rays inside the camera, the iris in the eye performs this same function by enlarging or closing the pupil.

Next, just as in the ordinary camera, the lens behind the opening bends light rays so that they come to a point in a small bright spot, called the focal point, similarly, the lens in the eye behind the iris, bends light rays on the retina. Thus images are formed on the retina in the eye just as they are formed on the sensitive surface of the film at the back of a camera. In the eye there is one arrangement not to be found in the camera. It is that there are tiny nerves that lead from the retina to the brain which interprets the images.

(iii) The scientific explanation is that objects look green, black or white according to the colour of the spectrum they reflect. Thus those objects which reflect the green colour of the spectrum look green, those that absorb all the colours of the spectrum look black and those that reflect all the colours of the spectrum look white.

Three pure colours of the spectrum, i.e. red, green and blue are called *primary colours*, because they cannot be produced by mixing other colours.

If red, green and blue are mixed in pairs or all three together in different proportions, all the other possible shades of all the colours can be produced.

Blue and yellow are called *complementary colours*.

Spectrum is the name given to the coloured band, which has red at one end and violet at the other, which is perceived when a ray of white light is made to pass through a prism.

(iv) Ultra-violet rays are efficacious in curing cases of rickets and other deficiency diseases. They are strongly germicidal and are put to many therapeutic uses. They are also used to enrich certain human foods with vitamin D.

X-rays are used in radio-therapy, in locating extraneous matter embedded in human or animal flesh, or taking pictures of broken bones and for other diagnose purposes. Other uses of these rays include study of crystals, examination of jewels and paintings. Also, large iron castings are examined for internal flaws etc. etc.

Infra-Red Rays. They are being used in infra-red photography because photograph taken by infra-red rays is brilliant and sharp. Even photos can be taken by their help in the dark. Infra-red rays were used in the war of 1939-45 to enable bombers to "see" their object in the dark. This can again be repeated if required. Their use is also made in increasing the power of search lights to penetrate fogs etc.

Radio waves. They are used for transmitting and receiving a high frequency electromagnetic signal through space without the use of wires between transmitter and receiver.

(v) **Chain reaction** is a reaction caused by the bombardment of an atomic nucleus, which releases enough energy to start a series of similar reactions.

(vi) **Photosynthesis.**

(vii) **Mouth.** The teeth in the mouth cut and grind the food into small bits so that it is easier for the digestive juices to act on it.

As the food is chewed, the saliva, which is a digestive juice and which contains the enzyme ptyalin acts on the starch in the food and converts it into sugar. It also contains a substance called mucin. It softens the food and makes it easy to swallow.

Stomach. In the stomach there are tiny glands that make gastric juice. When the food comes into the stomach it mixes thoroughly with the gastric juice. This gastric juice contains hydrochloric acid and the enzyme pepsin. Both these substances digest the protein substances in the food and leave the rest to be digested in the small intestine. The stomach performs movements like a ringworm which it does for a number of hours till the food becomes a creamy liquid.

Small Intestine. It is in the small intestine that the most important part of digestion is played. Here the liver which is connected to the small intestine by a duct sends to the small intestine the digestive fluid, the bile, which helps to digest fats. The Pancreas makes pancreatic juice which contains a number of enzymes which digest carbohydrates, fats and proteins of the food. It also sends these digestive enzymes to the small intestine. The walls of the small intestine also contain glands which pour digestive fluids into the food and these help further to digest carbohydrates and proteins so that the process of digestion gets completed in the small intestines. The intestines also perform a sort of churning movement so

that the food is made to thoroughly mix with the enzymes and thus no part of it remains undigested.

In the wall of the small intestine there are millions of hair like tubes called villi. These villi absorb the digested liquid food and as they are lined with networks of tiny blood capillaries, the digested food is poured by the villi into the blood capillaries and thus nourishment giving food is poured into the blood and carried to the whole of the body.

(viii) Enzymes are organic compounds which are secreted by plant and animal cells. They cause chemical changes in the substances on which they act. They are specific catalysts, for each enzyme catalyzes only one reaction or type of reaction. Thus the enzyme pepsin effects on the proteins, ptylin effects starch and so on.

Q. 148. (i) When you tightly plug the cut of a bleeding finger and remove the hand after some time, bleeding stops.—What is this due to ?

(ii) What is colour blindness. What cannot people who are colour-blind see ?

(iii) Explain how a convex lens helps a far sighted man ?

(iv) What does a liver excrete ? What does it store ? What effect has it on the blood that passes through it ?

(v) What types of food must be present in a complete food ?

(vi) In which organ of the body is insulin produced ? What is the disease called in persons whose organ ceases to produce insulin ? How is insulin produced and administered ?

(vii) Why do people with defective hearts pants after slight exertion ?

(viii) What are the chief waste products of the body ? How does it excrete them ?

(ix) Why is speed of breathing rapid after exertion ?

Ans. The blood has a substance called fibrinogen. When the skin is injured and blood begins to flow, this soluble compound, fibrinogen, is converted into a tough jelly-like material called fibrin. This causes the blood to clot and in this way it seals up the wound and stops the bleeding. We have to put our finger on the cut so that blood may not keep shooting from the cut as bleeding from large arteries or veins does not always cease, so we have to plug it with our finger and let enough fibrin to be formed to do the plugging when we can take off our finger from the cut.

(ii) Colour blindness is the inability to distinguish between

the different colours. Colour blind people cannot distinguish between red and green.

(iii) In a far sighted person, either the eyeball is so short or the lens is so flat that the images of near objects are formed behind the retina. The lens can form an image on the retina only when an object is held at a considerable distance from the eye. Far-sightedness is corrected by wearing convex lenses. A convex lens is thicker in the middle and therefore bends the light rays towards each other before they enter the eye. Thus they can form a sharp image on the retina.

(iv) The liver secretes bile.

The liver stores sugar, as also vitamins A and D and antianemic principles.

It destroys worn out blood cells of the blood that passes through it and by manufacturing new blood cells, pours them in the blood stream. Also, it produces fibrinogen which helps the blood in clotting.

(v) The food to be complete in all respects must contain the following in right proportions :—

1. Carbohydrates to impart energy to the body. Most important carbohydrates are : apples, beans, bananas, oatmeal, raisins, rice, sugar.

2. Fats and oils. These are our best energy giving foods. Most important of these foods are : Butter, cheese, ham, olive oil, cod-liver oil and different kinds of meat.

3. Proteins. These types of food are required for building body tissues. Most important are : Bread, cheese, peanuts, egg, beans and meats.

4. Mineral matter is also required for body building—iron for red blood, calcium and phosphorous for strong bones and teeth, sulphur for hair and nails, iodine for the thyroid glands. They are mostly found in milk, fruits and vegetables.

The above named foods when fresh also contain vitamins which are essential to health.

(vi) Insulin is produced in the pancreatic gland of the body.

The disease is called 'diabetes'. Insulin is produced from the islets of Langerhauns in the pancreas.

It is administered intravenously (that is) by puncturing skin with a needle through which the insulin hormone is forced into the blood stream).

(vii) Because after exertion fresh blood carrying oxygen has to be rapidly pumped to the tissues worn out by the exertion. In

normal persons the extra exertion does not put strain on the heart for this purpose, but it does prove a great strain upon people suffering from defective hearts whose blood pumping process is very weak, hence such people begin to pant even after slight exertion.

(viii) The chief waste products of the body are (a) the excreta from the intestine after digestion has been completed. This is thrown out through the anus. (b) Sweat is a waste product which is thrown out by the skin through its innumerable pores in the process of perspiration. (c) Urine is a waste product of the blood and tissues which is thrown out by the kidneys into the bladder and is discharged as urine by the latter through the penis or a woman's vulva. (d) Nose is a waste product thrown out by the nostrils.

(ix) During exertion there is great wear and tear of tissues. They require fresh oxygen, which combining with carbon of the tissues passes out as carbon dioxide. This oxygen can be supplied only by the lungs who have to take it rapidly from the air outside. This naturally increases the speed of breathing during the process of rapid taking in of oxygen from the air.

Q. 149. (i) Why are the smallest animals able to exist without any blood, while the largest animals have red blood ?

(ii) What is the function of the lymph in the blood ?

(iii) How much blood does a normal person have in his body ?

(iv) What is the advantage of chromium plating over other types of plating ?

(v) To what uses are following put : magnesium, zinc, lead, platinum, brass, bronze, Pewter ?

(vi) Name some of the most important alloys you know.

(vii) When a dog pants, does it heat or cool itself ?

Ans. The bodies of the smallest animals have no deep parts inside the body which must have oxygen to support life. Their outer skin derives oxygen directly from the air and this is sufficient for them.

In higher animals the inner parts must have oxygen to carry on life functions and this is supplied by the blood surcharged with oxygen that remifies through the whole body.

(ii) Lymph, carries white blood corpuscles (called leucocytes) from the blood and supplies the cells with nutrition. It also removes waste from the blood, while it returns excess fluid and some escaped proteins to the blood.

(iii) The average volume of the blood in man is 5 liters or about a gallon and a half or 7% of his body weight.

(iv) Chromium plating is done both for the smooth lustrous appearance it gives to the body and as a corrosion resistant. In other types of plating resistance to corrosion is lacking, as also that the lustre does not last for very long and the plating soon wears away which is not the case with chromium plating.

(v) Magnesium is used in making signal lights and fireworks as it burns very brilliantly. It is also used in medicines, in flash photography is the form of a ribbon, and in alloys with aluminium specially for airplane construction ; in the construction of incendiary bombs and flames. A strip of this metal is also used as a fuse in the thermite process.

Zinc is used in alloys *e.g.* in making brass. Its other most important use is galvanizing of iron by dipping iron into molten zinc or coating iron by electroplating. Zinc also finds use for the negative plates in electric cells.

Lead. It is used for covering cables, as lining for laboratory sinks, in electrolytic cells, in chambers for making sulphuric acid, in storage battery plates. It also finds use in storage of gasoline and ammunition, and in printer's type.

Platinum. This metal finds use in jewellery, special wires and crucibles for certain types of chemical analysis, as a very important catalyst in producing nitric and other acids, for standard weights and foils. It is also used in dentistry and in photography.

Brass is widely used for hardwares and ornamental hardware, electrical and plumbing parts *e.g.* valves and fittings.

Bronze. It is used for gun metal and bell metal ; also for machine bearings. valves, roofs, cornices, ornaments. It finds great use also in casting, art works and engravings.

Pewter has been used chiefly as a tableware, but now it has been replaced by chinaware.

(vi) Some of the most important alloys are :

Brass, bronze, stainless steel.

(vii) It cools itself by trying to remove bodily heat through panting.

Q. 149. (i) What are the following made of and to which uses are they put ?

Glass, cement, bleaching powder, glauher's salt, common salt, alum, borax.

(ii) Why does decaying cabbage smell worse than decaying grass.

(iii) Why does sulphuric acid blister your skin or it destroys cloth fabrics if it falls on them.

(iv) To what uses is the element sulphur put ?

(v) What is the fermentation of yeast due to ?

(vi) Why should a patient's skin be sterilized at the spot where the surgeon is to perform an operation ?

Ans. (i) (a) Ordinary glass is made by melting together sand, soda ash, lime or limestone and charcoal.

Glass is used in architecture, illumination, containers, window panes, in insulators and innumerable household uses.

Cement is obtained by burning together a mixture of lime or chalk and clay, until it becomes a clinker when it is broken up and ground down to a fine flour like bluish looking dust.

Cement is used as a binding material to unite two surfaces or cause a number of particles to adhere to each other. Due to the adhesiveness it brings about in materials it finds extensive use in the construction of buildings, dams, lining of canals, road surfaces etc. etc.

Bleaching powder is prepared by the action of chlorine on slaked lime.

It is used for whitening textiles, paper pulp, flour, fats, hairs, feathers, wood and other materials.

Glauher's salt is hydrated sodium sulphate, and is therefore, a compound of sulphur, sodium and oxygen, with 10 molecules of water.

It finds use as a mild laxative.

Common salt is sodium chloride.

The common salt is the chief source of our sodium and of chlorine. It finds commercial use in making glass, pottery, textile dyes, soap, in the preservation of food, specially meat, in making brine for some types of refrigeration systems and in human and animal diet.

Alum is the double sulphate of aluminium and potassium $(K_2 SO_4 Al_2 SO_4)_3 \cdot 24H_2O$.

It is used in medicine for its astringent properties. It also finds uses in dyes.

Borax is the hydrated crystalline salt of sodium, boron and oxygen.

It is used as an antiseptic, for cleaning textiles and metal surfaces and also in making glass, enamels, shellacs, ceramic, glazes.

(ii) Putrefying cabbage emits sulphur dioxide, which gives it its bad smell. Grass does not emit any such noxious gas for it has no sulphur material in it.

(iii) The blistering effect on skin or destroying of cotton fabric is due to the extreme affinity sulphuric acid has for water, mixing with a small quantity of which it generates great heat. In this process, therefore, due to generation of great heat and extraction of water from flesh or cotton on which it acts, it blisters the skin and destroys cotton fabrics.

(iv) Sulphur is used in making gun powder, sulphur dioxide, sulphuric acid, pulp paper, vulcanizing rubber, in matches and in insecticides.

(v) Fermentation of yeast is due to the chemical action on it of the enzyme called zymase.

(vi) Sterilization of the skin surface is done to ward off the harmful effect of bacteria in the atmosphere, which would otherwise pester the wound.

Q. 150. (i) Surgeons are often seen to wear a mask on their face, covering mouth and nose, before they undertake an operation. Against what is this precaution?

(ii) What causes

(a) Influenza (b) Scarlet fever (c) Boils (d) Malaria (e) Plague (f) Infantile paralysis (g) Decay of teeth (h) Dandruff (i) Sleeping sickness (j) Enteric fever?

(iii) How would you clean drinking water which you suspect to have got infected?

(iv) What is meant by "fixation of nitrogen"?

(v) Of what use is humus to the soil?

(vi) Some bacteria are harmful to man yet there are others extremely useful to man. Mention the kinds of both and state what harm the harmful do to us and what good the others do.

(vii) Food properly tinned does not easily putrefy. Why?

(viii) What do you mean by "pasteurization of milk"? How is this done?

(ix) What gives sour taste to bad milk ?

Ans. (i) This is done as a precaution against inhaling disease germs of communicable diseases either emitted by mouth of the patient or by microbes in the air coming in contact with the festering wound of the patient and also to ward against inhaling noxious gases.

(ii) Influenza is said to be caused by a virus (called bacillus influenzae) which a person inhales from the breath of one suffering from this contagious disease.

Scarlet fever is a contagious disease caused by streptococcic bacteria, spread by the secretions from the nose and throat.

Boil is caused by bacteria which enter through the hair follicles of sweet glands.

Malaria is caused by the bite of the anopheles mosquito containing in its mouth the malarial parasite.

Plague is a fatal epidemic disease. The mosquito attacks the diseased rats carrying the plague germs, These germs thus enter its body. When it next attacks a person, the plague germs are introduced into the blood stream of the person and thus the person catches the plague.

Infantile paralysis. This is also called poliomyelitis. This is an epidemic disease of the central nervous system caused by a virus carried in the spray of sneezing or coughing of a person suffering from this disease and thus imparted to others.

Decay of teeth is due to the action of ferments and microbes. The particles of food which are allowed to remain between the teeth due to defective or even neglect of washing of the roots of the teeth undergo chemical changes. In this way enough acid is formed to eat through the enamel of the teeth, thus making an opening for the microbes and destroy the teeth.

Dandruff is formed as a hard scaly dirt on the scalps of persons who do not wash and grease their scalps.

Sleeping sickness. This is a disease caused by the bite of the tsetse fly which carries the parasite, prevalent in tropical Africa. The person goes to deep sleep from which he does not recover.

Enteric fever. This is also called typhoid fever caused by a virus (known as bacillus typhus) which enters the body of a person who has drunk water or taken ice contaminated by this virus ; also contaminated milk or direct contact with the stools of a patient suffering from this disease.

(iii) The best and most readily available germicide is Potassium permanganate, which can be got from any chemist. A very small quantity of it should be stirred in the water and this will make the water drinkable.

Large quantities of water may be chlorinated, for chlorine is a powerful germicide.

(iv) By Nitrogen fixation we mean the conversion of atmospheric nitrogen into nitrogenous compounds. This is now performed by the Haber process for converting the nitrogen of the atmosphere into ammonia.

Bacteria also helps this fixation of nitrogen in the roots of plants and thus gives the plant a good fertilizer.

(v) Humus is decayed animal and vegetable matter. It helps to make soil productive. This is done by aiding plant growth by conserving moisture, loosening soil particles to admit air and water and by releasing mineral nutrients.

(vi) Harmful bacteria cause tuberculosis, scarlet fever, anthrax, typhoid fever, pneumonia, plague, boils, cholera, decay of teeth, septic wounds, infantile diarrhoea etc. etc. Useful bacteria converts our milk curd into cheese, helps in the fixation of nitrogen in plant roots to which it thus supplies fertilizers in the form of nitrogenous compounds. Bacteria also helps in curing tobacco, tanning leather, and in a great many other industrial processes. Sewage disposal is greatly facilitated by bacteria, for the sewage is often allowed to trickle slowly over a large surface. Bacteria flourish on this surface, and having a good air supply, are very active. They feed on the proteins etc. in the sewage and change them into carbon dioxide, nitrates and water. This process converts offensive sewage into a clear liquid which can then be safely run into rivers.

(vii) Food which has been properly sterilized is tinned. As this is hermetically sealed it does not contain bacteria which could produce fermentation or any other kind of putrefaction. Hence such a food, hermetically sealed off from the effect of bacteria does not go bad for long.

(viii) Pasteurization is the method of treating food, especially milk, to make them free from disease carrying bacteria. Thus milk is heated to 145°F for about 30 minutes and then rapidly cooled and sealed off in a tin can so that bacteria does not attack it again.

(ix) This is due to the harmful effect of bacteria on milk, which has changed the sugar of milk into lactic acid, which gives the sour taste to bad milk.

Q 151. (i) What are disinfectants? Name those in common use.

(ii) It is said that salted meat keeps eatables for years. Why?

(iii) Explain why foodstuffs go bad in hot damp weather within a few hours, but not during winter.

(iv) What is the function of the blood in the human body?

(v) What are toxins and antitoxins?

(vi) What are the chief agencies working in nature that form mountains?

(vii) What do you understand by sedimentary and igneous rocks?

(viii) What is soap made of? Why has it the power of detaching dirt from clothes?

(ix) What are proteins? Where do you find them most?

Ans. (i) Disinfectants are those substances which counteract disease germs, chiefly by destroying them and prevent infection from spreading.

For attacking air-borne germs the best disinfectant is formaldehyde; for those in the body or its discharges, a great variety of antiseptics are useful. These antiseptics include carbolic acid, dichloride of mercury in weak solution, boric acid, silver nitrate, sterile boiled water, etc. Steam acts as a very good antiseptic.

(ii) Because salt inhibits the growth of bacteria, which thus do not spoil salted meat.

(iii) Because in hot damp climate there is extremely rapid growth of microbes which spoil food, by causing putrefaction in it.

(iv) Blood brings nourishing food and oxygen to the body tissues and carries off carbon dioxide and other waste material of the body, distributes hormones and protects the body against infections.

(v) Toxins are poisons produced by certain organisms especially bacteria.

Antitoxin is a chemical substance formed in the body which acts against a poison (i. e. a toxin) given off by a germ. Thus it confers a transient passive immunity in human beings to certain diseases.

(vi) Most mountains are formed by volcanic activity, by the volcanoes bringing liquid rock from the inside of the earth to the outside of the earth. Hills or mountains are also formed by the movement of the rocks that form earth's crust. The earth's crust undergoes warping and twisting. As a result, some regions of the earth are pushed up slowly, until huge folds or wrinkles are made, forming hills and mountains.

Another explanation given by scientists is that the rocks on continents are lighter than rocks under the oceans. As the heavier material under the sea sank deeper towards the centre of the earth, it pushed the lighter materials of the continents upward. Thus the continents got raised and the oceans deepened. This explains the fact that some mountain series such as the Rockies and the Appalachians in North America are near the coast line, so also the Western Ghats in the Deccan in India.

(vii) **Sedimentary rocks** are those rocks which have been laid down as deposits, chiefly by water action; most commonly as the result of consolidation under water of particles like sand, muds, clay, pebbles etc. washed into the seas and lakes by rivers and to a much smaller extent by winds.

Igneous rocks are those rocks which have been formed by the cooling of molten material from the earth's interior. Example: granite.

(viii) Soaps are made essentially by stirring an alkali *e.g.*, caustic soda into heated fats or oils and adding salt to cause soap to form curds; these are usually churned and poured into frames or to produce hard ones they are run over chilled rollers scraped off and shaped.

The loosening of dirt from clothes and other articles depends upon the property of soap to lower surface tension of water in which the clothes have been immersed emulsifying grease and absorbing dirt into the foam.

(ix) **Proteins** are complex food substances which are organic compounds of nitrogen, and very essential to life.

Lean meat, fish, cheese and eggs are richest sources of them.

Q. 152. (i) What is artificial silk? How is it prepared?

(ii) What is paper made of?

(iii) Of what are cell walls of plants made?

(iv) Name the chief starch foods in the daily use.

(v) Of what are paints made?

Paints dry quicker in summer than in winter. Why?

(vi) What is vinegar? How is it prepared?

(vii) What gases are taken in and given out

(a) by animals,

(b) by a plant in the dark.

(c) By a green plant in sunlight?

(viii) What is soda water made of?

(ix) How do fish swimming at great depth in water breathe?

Ans. (i) Artificial silk, also called rayon, is synthetically prepared from fibres made from the cellulose of the fibres of plants and the fabrics are then woven from them. The process in a nutshell is this : wood pulp or cotton linters that contain the cellulose is dissolved in a chemical. It is then forced through minute holes so that filaments, hardened either in liquid or warm air are formed. Filaments are then either twisted into threads or cut into lengths and spun.

(ii) Paper is made from fibrous materials, *e. g.*, rags, straw, wood (or combinations thereof), treated chemically and then suspended in water on a screen.

(iii) Cell walls are made of cellulose.

(iv) The most important starchy food we daily use are :—

Wheat (in the form of bread), rice, maize, potatoes, cassava (as tapioca), sago, arrowroot, peas and beans.

(v) Paints are liquid mixtures containing a pigment (for the purpose of making the liquid opaque and give it the particular colour required) and a diluent (to hold the pigment in suspension and to make its spreading easier) and materials in it to serve as binders, driers etc.

The drying of paints is a *chemical reaction*. It is therefore hastened by warmth ; for this reason paint dries quicker in summer than in winter.

(vi) Vinegar is a sour liquid consisting of dilute acetic acid.

It is obtained by the acetic fermentation of dilute alcoholic liquids ; *e. g.*, wine, beer etc.

It is used as a condiment and as a preservative.

(vii) (a) Animals take in oxygen and give out carbon dioxide gas.

(b) In the dark oxygen is taken in by plants and carbon dioxide is given out.

(c) In sun-shine green plants cause carbon dioxide and water to form sugar and starch. In this process carbon dioxide is taken in, while oxygen is given out.

(viii) Soda water is water containing carbon dioxide under great pressure.

(ix) Water contains dissolved air in it. It is the oxygen of the dissolved air taken in by fish through their gills that serves the same purpose as our taking oxygen of the air through our lungs.

Q. 153. (i) What are antibiotics ? Name some of the most important antibiotics and the uses to which they are put.

(ii) What is an emulsion ? Is milk an emulsion?

(iii) What are insecticides ? Name some of the most important insecticides in general use.

(iv) What are anesthetics ? To what uses have they been put?

(v) What are sulpha drugs ? To what uses are they put?

(vi) Wherefrom does the body get its heat and energy?

(vii) What is dry ice? To what uses is it put?

(viii) Carbon monoxide is a deadly gas that kills human beings, but not insects and plants. Why ?

(ix) What information is given by the statement that the formula of water is H_2O ?

(x) Do you think that a flame burning in compressed air would be hotter or cooler than a flame burning in ordinary air ? Give your reason for the conclusion you arrive at.

Ans. (i) Anti-biotics are substances obtained from living organisms (molds and bacteria) which put a stop to the growth of or destroy certain micro-organisms.

Most important are : penicillin, terramycin, streptomycin, chloromycetin, aureomycin.

Most important ailments to fight which they are now in general use are : pneumonia, gonorrhea, arthritis, endocarditis, syphilis, blood and bone infection, enteric fever etc.

(ii) A mixture of finely divided liquids, one in another, is an emulsion. Milk is an emulsion.

(iii) Insecticides are substances which are used to destroy pests.

In common use are :

Carbon disulphide to kill root pests.

Lime sulphur to kill fungus.

Creosote and paraffin used against household and personal vermin.

Arsenic compounds (e. g. Paris green) against biting insects ; D. D. T. (dichloro-diphenyl-trichloro-ethane) against bugs, flies and fleas at home.

(vi) Anesthetics are drugs which induce loss of sensation or unconsciousness.

Most important general anæsthetics are : Ether, chloroform, nitrous oxide, ethylene chloride, morphine, ethyl bromide.

Those locally applied are cocaine, procaine, ether, spray, etc.

(v) Sulpha drugs are synthetic chemicals which are used in the treatment of bacterial diseases. For example in the treatment of pneumonia, gonorrhœa, erysipelas, blood poisoning, septic sore throat, kidney infections etc.

Most important of the drugs are sulphadiazole, sulphadiazine, sulphapyridine, sulphagrandine.

(vi) The food that we eat is turned ultimately into glucose by the liver and is poured as a nourishment in the blood stream, where it is supplied to every tissue of the body.

Now in the process of respiration oxygen of the air is taken up by the blood stream, and this changes the glucose into carbon dioxide as a result of chemical change, and this gives out heat energy—that is why our body gets warm, and also gets the energy we use in moving our muscles.

(vii) Dry ice is solid carbon dioxide. Dry ice is used for refrigeration.

(viii) Carbon monoxide gas proves a deadly poison to human beings, because it combines with the hæmoglobin in the blood and destroys red blood corpuscles. It thus kills a man by poisoning his blood.

Insects and plants have no blood in them, hence carbon monoxide has no effect on them.

(ix) The formula implies that one molecule of oxygen combines with two molecules of hydrogen to form water.

(x) Compressed air has more oxygen than uncompressed air, hence a flame will burn in it brighter due to the greater amount of oxygen it gets. It will be also hotter.

Q. 154 (i) What is a rainbow? How and when is it formed? What are the colours refracted by it counting from inside?

(ii) Clear nights are often colder than cloudy nights. Why?

(iii) What is coal-tar? What most important products have been derived from it, and the uses to which they have been put?

(iv) Who first discovered that the earth and the other planets go round the sun?

(v) What is the name of the process in which soil or rocks

are eaten or washed away by action of wind or rain or river ?

(vi) What is the name of the process in which metal or stone is eaten away by action of oxygen and weak acid in the air.

(vii) Who was the inventor of the safety lamp ?

What does such a lamp prevent?

(viii) What is the simple process called in which liquids are separated by boiling.

Ans. (i) The rainbow is a heavenly phenomenon in the form of a round bow with various colours regularly dispersed in it, like a ray of the sun seen through a prism. This is caused by the decomposition of light by countless drops of water in the air after rainfall.

The colours refracted counting from inside the bow are in order : violet, indigo, blue, green, yellow, orange and red.

(ii) On clear nights heat of the earth is radiated away far into space. On cloudy nights much of the radiation is reflected back to earth and hence there is greater warmth on a cloudy night than on a starry night.

(iii) Coal tar is the black, oily, viscous liquid obtained when coal undergoes destructive distillation.

Most important products derived from it are : benzene, toluene, aniline, xylene, carbolic acid, creosol, pyridine etc.

These are useful as medicines and as fast dyes, synthetic perfumes and essences.

(iv) Copernicus.

(v) Erosion.

(vi) Rusting of iron, verdigris of copper.

(vii) Sir Humphry Davy.

It prevents explosions in mines, which often occurred when lamps with naked flames were used in mines, before this lamp was introduced.

(viii) distillation.

Q. 155. (i) What is the name of the system of signalling by dots and dashes.

(ii) Name the great scientist who gave us the Theory of Relativity.

(iii) What is an electro-magnet ? To what uses is it put ?

(iv) What is an internal combustion engine?

What are the following :—

(a) diesel engine, (b) rocket (c) a gas lantern, (d) a jet engine?

(v) What is a planet ? What is the nearest planet to (i) the earth (ii) the sun ? Which is the largest planet?

(vi) In which respects do the following differ from each other?

Cast iron, wrought iron, steel.

(vii) What is the first stage of an insect called ?

What are grubs, caterpillars and maggots?

(viii) Name the imaginary line that divides the earth into two equals.

What are lines drawn parallel and perpendicular to the above called ?

(x) What do you understand by the life cycle of a creature?

(x) Who was the scientist who invented the "Theory of Evolution." In which book did he expound this theory?

Ans. (i) The Morse Code.

(ii) Einstein.

(iii) An electromagnet is a magnet made by passing an electric current (the D.C.) through a coil of wire wound about a piece of soft iron.

Electromagnets find innumerable uses. Powerful electromagnets are used to lift heavy masses of iron or steel; they are employed to separate iron or steel from the brass or other metal turnings in which the different metals may have got mixed. "In the process of grinding rubber, charcoal, chocolate and snuff, particles of iron unavoidably become mixed with the material, and these particles are removed by an electromagnetic separator". In hospitals iron fragments are removed from the eye by attracting them with the help of electromagnets.

Electromagnets find wide use in electric motors and generators and in telephones, in transformers, in induction coils and in wire-less circuits etc. etc.

(iv) Internal Combustion Engine is an engine in which a mixture of the fuel used in it along with the air is ignited within the cylinders themselves; the fuel used being petrol as in the motor car engine, coal gas or other gases in gas engines etc.

Diesel Engine. This is an internal combustion engine which runs on crude oil and which explodes the fuel mixture with the heat of compression of air to raise air temperature to ignition point.

Rocket is a projectile which is propelled by force within itself. It is set in motion (i.e. it derives its forward thrust) by the reaction of rapid stream of gas escaping through its vents.

Gas turbine. This is a type of power wheel which is whirled by the force of highly compressed hot air, gas or steam injected on its blades.

Jet Engine. This is a type of engine which is used for jet propulsion. This is an internal combustion engine in which the burning of fuel is carried on with previously compressed air. The gases are allowed to escape at a high speed that they may provide the reaction for the forward thrust of the air-craft.

(v) A planet is a satellite of the sun in our solar system. It is an opaque, spherical body, revolving counter-clockwise about the sun and shining by reflected sun-light. Our earth is one of the planets revolving round the sun.

Venus is the nearest to the earth.

Mercury is the nearest to the sun.

Jupiter is the largest of the planets.

(vi) It is the equator. Lines parallel to the equator are called latitudes and those perpendicular to it are longitudes.

(vii) Charles Darwin in his book *Origin of the Species*.

Q. 155. (i) What name do you give to the seasonal winds that blow over the Indian subcontinent between June and September?

(ii) Who was the scientist who stated that lightening is nothing but electricity. How did he arrive at the conclusion?

(iii) Who invented?

(a) The phonograph. (b) Vulcanized rubber

(c) The spinning mule. (d) The Dynamo

(e) Barometer.

(f) Movable type printing.

(g) Telescope. (h) Heavy water. (i) Insulin

(j) Penicillin.

(iv) Who propounded the laws of the falling bodies?

(v) Who is the scientist who stated that light is electromagnetic in nature?

(vi) Who was the surgeon who introduced antiseptic treatment of wounds ?

(vii) Who stated that water is only a chemical compound of oxygen and hydrogen ?

(viii) Which is the lightest inert gas ?

(ix) Who discovered the circulation of blood in the human body?

(x) Who invented the incandescent electric lamp?

Ans. (i) Monsoons.

(ii) Benjamin Franklin.

By experiments with kites in a thunderstorm he proved the identity of lightning and electricity.

(iii) Phonograph was invented by Thomas Alva Edison.

Vulcanized rubber was invented by Goodyear.

Spinning mule was invented by Crompton.

Dynamo was invented by Michael Faraday.

Barometer was invented by Torricelli.

Movable type printing was invented by Gutenberg.

Telescope was invented by Hans Lippershey.

Heavy water was invented by Urey.

Insulin was invented by Banting and MacLeod.

Penicillin was invented by Sir Alexander Fleming.

(iv) Sir Isaac Newton.

(v) J. C. Maxwell.

(vi) Lister.

(vii) Henry Cavendish.

(viii) Argon.

(ix) Harvey.

(x) Edison.

Q. 23. (i) Who is the inventor of the Periodic table?

What is this table ?

(ii) Who introduced vaccination by cowpox ?

What is the underlying principle on which it is based ?

(iii) What different processes would you employ to prevent iron from rusting ?

(iv) How are gramophone records made?

(v) Explain how you could construct an instrument which would increase the voltage of an alternating electric supply from 200 to 20,000.

(vi) Why do the sky and the waters of the ocean look blue ?

(vii) Why is the setting sun so crimson red ?

(viii) Why is the North Star so very useful to navigators ?

(ix) Why does the sun at sunset or early in the morning when it rises above the horizon look so much bigger than at mid-day ?

(x) Why is the sun so much hotter at mid-day than at other times of the day ?

Ans. (i) The periodic Table was first invented by the Russian scientist Mendeleeff.

The Periodic Table is an arrangement of the chemical elements in order of atomic weights.

(ii) Jenner.

It is based on the principle that if a preparation of the dead bacteria of the variety responsible for a given disease be introduced into the blood stream of a patient suffering from that disease then the injection of the preparation increases his resistance to the disease.

(iii) Iron may be prevented from rusting (1) By painting. There will be no rusting so long as the paint remains on the iron (2) By tinning. This is done by dipping iron in molten tin. (3) By galvanizing. Iron articles are galvanized by dipping them in molten zinc. This process is applied to corrugated iron, wire netting, bath tubs, buckets etc.

(iv) Gramophone records are made of songs sung by some one. The song is sung inside a sound proof studio to prevent outside sounds being reproduced on the record. When the song is sung, the sound is picked up by a microphone which converts the sound waves to electrical impulses.

From the microphone the electrical impulses are directed to the control room, where impulses from two or more microphones are balanced for good recording. The impulses are then directed to the head of an electrically agitated stylus which contains the needle that works on the recording machine.

The recording machine consists of a table that turns round and round by an electric driven motor. On this machine is a round record-blank soapy wax material. When the recording of the song begins, the cutter (i.e., the stylus containing the fine needle) is lowered into the wax at a constant speed. The electrical impulses from the

control room to the head of the stylus cause it to cut a wavy groove in the disc of wax.

This disc after the recording is over is then copper plated. From this one or more matrices are made and used in the manufacture of the familiar record.

(v) This is done by help of a transformer which is a device for increasing or decreasing voltage of an alternating current.

In it two separate insulated coils wound round an iron core are used. Alternating current led through the first (i.e., the primary coil) induces similar current in the other (i.e., the secondary) coil of different voltage. Now if the secondary coil has more turns than the primary, the voltage is "stepped up" and *vice versa*. So if the voltage has to be increased from 200 to 20000 we use the turns in the proportion required of the voltage to be increased ; in this case in the production of 200 to 20000.

(vi) Blue part of the spectrum of light is scattered by the countless particles of the atmosphere around the earth, while the rest of the spectrum passes through it, that is why the sky looks blue.

Mass of waters of the ocean looks blue because of the reflection on it of the blue sky above it.

(vii) At the time of setting of the sun, the crimson red part of the spectrum gets scattered by the particles of atmosphere ; that is why it is crimson red then.

(viii) The pole star—also called the North Star—is useful to navigators of the Northern Hemisphere because as it remains constantly at about 1° away from the N. celestial pole, navigators by locating it, locate the direction in which they are moving in the seas.

(ix) When the sun begins to get out of the horizon its rays are more slanting than when it is directly overhead and they get refracted by the thick haze of air through which they have to pass. On account of this slanting of the rays of light of the sun it looks larger than at mid day when the rays come directly to the earth without slanting and getting refracted.

(x) At mid day the sun is directly overhead. The rays have to pass through a less thicker layer of the atmosphere than at evening and morning. Due also to less refraction the area they cover is comparatively less. Hence there is greater heat in the rays at noon than in the slanting rays of the morning.

Q. 24. What are the following ?—

(a) Comets.

- (b) Nebula.
- (c) Constellation.
- (d) Plastics.
- (e) Legumes.
- (f) Air conditioning.
- (g) The Braille system.
- (h) The molecular theory.
- (i) Milky way.
- (j) A fertilizer.
- (k) An electron microscope.
- (l) A calorie.
- (m) Carburettor.
- (n) A cold front.

Ans. (a) Comets are heavenly bodies that travel about the sun in extremely elongated orbits. A comet consists of a head of cloudy brightness, within which lie one or more bright nuclei and a tail which may extend to millions of miles.

(b) Nebula is an irregularly shaped mass of glowing gas like material in outer space.

(c) Constellation is a group of stars, forming some figure or a pattern. They were conceived of by the ancients as representing some mythological figures.

(d) Plastics are materials, like celluloid, or bakelite, made from common substances which can be shaped when soft, but which when hard retain their shapes.

(e) Legumes are an order of plants which comprise pulses (peas, beans etc.) clover etc, which have a great food value largely due to their protein known as legumen, found in their seeds which grow in pods. They have nitrogen fixing bacteria in the nodule of the roots.

(f) Air Conditioning. This is artificial treatment of air in building to control temperature and humidity of the air.

(g) The braille system. This is a system that represents letter or musical symbols by different arrangement of six raised points that can be readily embossed on paper. A blind person identifies them by the touch of his fingers.

(h) The Molecular Theory. This theory states that all matter is made up of tiny particles in a constant state of motion.

(i) Milky way. This is another name for Galaxy. This consists of cluster of billions of stars in the heavens, having a hazy

semi-continuous appearance. In addition to stars, gaseous nebula and dark nebula also make part of its composition. It can be seen in a clear starry night.

(j) **A fertilizer.** It is a material containing nitrogen, phosphorus, potash and other elements essential to plant growth. Examples are animal manures, bone meal, nitrate of soda, super phosphates etc.

(k) **An electron microscope.** This is a special type of microscope which uses, instead of light rays, a stream of electrons controlled by electric or magnetic fields. It permits greater magnification and depth of focus. It enables viruses to be seen which is impossible with the ordinary microscope.

(l) **A calorie.** A calorie is the quantity of heat needed to raise the temperature of one gram of water through one degree centigrade.

(m) **Carburettor.** This is a device in internal combustion engines that controls the flow of fuel to the cylinders and prepares the fuel for ignition i.e. it vaporises it and mixes it with air.

(n) **Cold front.** This is a region in the atmosphere where a cold dry air mass from the north pushes under a warm-air mass.

Q. 25. (i) What are Little Bear and Great Bear ?

(ii) **Why are whales, seals and bats called mammals, though whales and seals live in the sea and bats fly in the air ? Why are fish and sparrows not called mammals ?**

(iii) **What is a fossil ? Of what use are fossils to us ?**

(iv) **What is a parasite ? Name some parasites that are useful to their hosts and others that are harmful to them.**

(v) **What is hibernation ? What animals hibernate? When ?**

(vi) **What is adaptation of an organism to its surroundings ? Give examples of animals, as also illustrate your answer by showing how birds are adapted to flight.**

(vii) **What has nature given to certain animals to enable them to escape from their enemies ?**

(viii) **What are migratory birds ? Which birds visit India from foreign countries ?**

(ix) **What is metamorphosis ? Give examples from animals you know ?**

Ans. (i) The Little Bear and the Great Bear, called also the Ursa Minor and Ursa Major are two constellations of the North Hemisphere.

The Little Bear is an inconspicuous constellations of which the pole star is situated near the celestial pole.

Ursa Major consists of seven bright stars, two of which are known as "the pointers", since a line joining them will, if produced, pass to the celestial pole and the pole star.

(ii) Whales, seals and bats all have mammary glands for sucking their youngs and they are therefore classed as mammals. Fish and sparrows have no mammary glands and are not therefore among the mammals.

(iii) A fossil is the form or remains of ancient living things preserved in rock, coal, earth or gum.

They are useful to us, in that their scientific study, paleontology, yields us data valuable in archaeology (i.e. the scientific investigation of man's past by the study of relics found in ruins or excavated from buried deposits), evolutionary biology and ethnology of the manners and customs of people).

(iv) Parasite is an animal living on animal or plant which lives on and gets its food from the body of another plant or animal.

Examples of harmful parasites : Liver fluke of sheep, tapeworm in hogs and cows. These parasites eat up their nourishment; the microscopic parasites causing malaria and plague in man; there are many other disease producing bacteria.

The Mistletoe; toothwort, dodder and various fungi on plants.

Useful parasites. (1) The fungus and alga live together to mutual benefit and form the lichen (2) The nitrogen fixing bacteria that form nodules on the roots of leguminous plants like alfalfa. The parasite bacteria gets its sugar while the plant its nitrogen.

(v) Hibernation is the prolonged winter sleep of animals whose food is scarce during severe cold. Examples : Frogs, bears, squirrels, prairie dogs, bats etc.

(vi) By adaptation is meant the special structural features or emphasis and growth of certain characteristics which prove useful to animal or plant in aiding its survival.

Thus the sharp-cutting dentition of a cat is adapted to its diet of flesh, whilst the grinding molars of a sheep or horse are adapted to the diet of a herbivore. Similarly the giraffe by striving to reach the upper branches lengthened its neck and the tendency to his adaptation was inherited.

The body of a bird is extremely light, its bones are hard, thin and papery and full of air sacs, which communicate with the lungs. This feature serves a double purpose; first it lowers the specific gravity of the body, thus making it easier for the bird to remain floating in the air and secondly it forms a reservoir of air, so that there is plenty of oxygen available for the liberation of energy it requires for its active life.

Next, the body of a bird is streamlined, being rounded and gradually tapering to a long tail. This shape tends to lessen air resistance during its flight.

Its feathers are also a supreme adaptation to flight, for the bird forces itself along by the large surface of its wing which act in the air in the same way, as the oars of a boat in water. The spread out tail guides the bird in the same manner that a rudder guides a ship.

(vii) Animals escape from their enemies in various ways, some of which are enumerated below :—

1. Some creatures like the green caterpillar of the cabbage butterfly is almost invisible as it crawls on the green leaf. This mixing up of the colour of its body with its surrounding enables it to escape detection by its enemies.
2. Many creatures like slugs and snails, woodlice and centipedes lurk under stones and crevices during the day time and come out only at night. Thus they are not seen by birds who eat them. Similarly earthworms come out only during night time.
3. Some animals like crabs and lobsters, tortoises and turtles have armour to fight against their enemies. This protects them against carnivores.
4. Many animals escape from their enemies by the speed with which they flee from them. Thus hares, deers and horses escape by the fleetness of their feet. Houseflies, butterflies, dragon flies escape by rapid flight.

(viii) Birds which change their habitat at certain seasons of the year are called migratory birds. Many kinds of birds migrate singly or in flocks over immense distances, breeding in colder climates and spending the cooler seasons in warmer regions. Thus

the crow breeds in the forests of Russia during summer and comes to northern India during the mild winter.

(ix) **Metamorphosis** means the substantial changes in the structure of their bodies, certain animals undergo during a comparatively short period of their lives.

Thus for example, the frog has a tail and gills during the first stage of its growth and lives like a fish entirely in water. In a few days it sheds both tail and gill and becomes an amphibious frog with fully developed limbs. Similarly the butterfly has many stages in life quite different in structure and look from each other. Its eggs hatch into grubs called caterpillar larvae, which pass on to a stage called naked pupae or chrysalises and these emerge as butterflies with wings and other parts of the body not to be found in earlier stages.

Q. 26. (i) What do you understand by the term "Phases of the moon," Why do we see only one side of the moon?

(ii) It has been stated by scientists that the sun is likely to retain its present amount of energy for millions of years to come. What is this assumption based upon?

(iii) If a gun were fired from the moon, would we hear its noise?

(iv) What are sunspots? What effect have these spots on our earth?

(v) What would have happened to life on earth if its mass had been (1) much lighter than what it is now (2) much heavier than it is now?

(vi) Why does the housewife blacken the part of her *degchi* (vessel in which she cooks her food) exposed to the fire of the kiln?

What would happen were she next to burnish it before putting it on the kiln to cook her food?

(vii) What part is played by the haemoglobin in the blood?

How does the blood help us to fight our external enemies?

(viii) What is the difference between potential and kinetic energy? Does a pendulum possess both kinetic and potential energy? If so, when?

(ix) State how you would change :

(a) Chemical energy into heat energy.

(b) Energy of motion into electrical energy.

(c) Electrical energy into radiant energy.

(x) What kind of energy is changed into what other when:

(a) A candle burns.

(b) The kitchen tap is turned on.

(c) A moving body is slowed down by friction.

Ans. (i) Phases of the Moon are the changes in the appearances of the moon's disc due to the variations in the area of the illuminated portion seen from the earth.

Thus at one time it is quite invisible. It is then called the new moon. Next, in the first quarter, the right hand crescent is visible and this goes on increasing and the dark invisible portion goes on decreasing till at full moon, the whole is visible.

Since the moon revolves on its axes in the same time as that which it takes to revolve round the earth, it always presents the same face to us. Hence we never see its other side on this point.

(ii) Many theories have been advanced to account for the enormous output of energy by the sun.

One theory is that radio-active substances in the sun like radium disintegrate and give out the great amount of energy it throws out.

Another factor is said to be changes in the atomic structure taking place in the sun's material. The sun due to the extremely high temperature in its interior acts like a huge cyclotron smashing the hydrogen atoms which turn into helium with release of enormous energy and since the sun has enough hydrogen in it this process will go on for millions of years and during this time the sun will maintain its output of this energy.

A certain amount of heat must also be due to the contraction of the sun's material, since the contraction of gases leads to rise in temperature. It is thus probable that each of these factors share in maintaining this constant stream of radiant heat and light given out by the sun.

(iii) There would be no sound of the gun heard on the earth, since there is a vacuum between the earth and the moon. Sound does not travel through a vacuum.

(iv) Sunspots are dark spots on the sun's surface. They are believed by scientists to be tornado-like solar storms. They are somewhat cooler than the surrounding areas, so they appear dark in contrast.

They are co-related with disturbances on the earth, such as magnetic storms and increased rainfall.

(v) (1) There would be no atmosphere on the earth as there is none on the moon, for during the course of its revolution the atmosphere would have flown away into space due to the reduc-

ed gravitational pull of the earth. There would thus be no possibility of life.

(2) If the earth were much heavier than it is, it would have retained by its enhanced gravitational pull, the hydrogen which its atmosphere probably once had. This combining with oxygen would have turned the whole of the atmosphere into water. As the atmosphere would have missed oxygen, the nitrogen and other inert gases in it would not have supported life.

(vi) By blackening her *degchi*, she enables the latter to absorb more heat than if the *degchi* were burnished; for dark surfaces absorb radiant heat, while burnished surfaces reflect it. Hence the food will cook faster in the darkened *degchi* than in one whose surface has been burnished.

(vii) The haemoglobin of the blood carries oxygen from the lungs to the tissues of the body, as the blood circulates to the tissues of the body through capillaries. This oxygen combining with tissues gives us heat and energy.

The phagocytes—which are a part of the white corpuscles of the blood serve as a defensive system in the blood stream against certain bacterial infection. For they respond by an increased number in the blood, they then migrate from the blood stream to the site of infection and destroy the invading bacteria.

(viii) Kinetic energy is the energy or the ability to do work that a body possesses by virtue of its motion.

Potential energy is the energy or the ability to do work that a body possesses due to its relatively higher position to another.

Thus a large quantity of water stored up in a dam, high above the ground below it possesses vast potential energy if put to use. The water may be brought down through pipes to run the wheel of our mills or the blades of our turbines and thus generate hydro-electric power. While descending through the pipes it possesses great kinetic energy due to its downward motion.

A pendulum possesses both kinetic and potential energy. At the highest point of its swing it possesses potential energy due to its position; at the lowest point of the swing it possesses the maximum kinetic energy. In between the highest and lowest points of its swing it possesses both kinetic and potential energies.

(ix) (a) Chemical energy is changed into heat energy during the process of production of slaked lime, by addition of water to limestone.

(b) The dynamo converts energy of motion into electrical energy.

(c) A wireless transmitter converts electrical energy into radiant energy.

(x) (a) When a candle burns it changes chemical energy into kinetic energy.

(b) When a kitchen tap is turned, the potential energy of water in the tap is changed into kinetic energy.

(c) When a moving body is slowed down by friction, energy of motion is converted into heat energy.

Q. 27. What are:—

(a) Radio waves

(b) Infra red rays

(c) Beta rays

(d) Gamma rays

(e) Ultra-violet rays

(f) X-rays

(g) Alpha rays

(h) Radar.

Ans. (a) The radio waves are electro-magnetic waves whose range in wave-length varies from 20 kilometers to less than a centimetre.

When an electric charge is made to surge up and down a transmitting aerial, electric and magnetic waves are produced which travel outward at 186000 miles per second. These are our radio waves used for radio signals.

(b) Infra red rays are the invisible portion of the spectrum of light rays, which have a wave length longer than the wave length of light rays. It is these rays that produce the heating effect. Thus the radiant heat felt from an electric fire, or gas fire or from sunlight is produced by these infra-red-rays.

(c) Beta rays. These are a stream of negatively charged particles (called electrons) thrown out by certain radio-active substances.

(b) The Gamma rays is a type of radiant energy similar to X-rays, sent out by certain radio active substances. These waves have very great penetrating power, and have a velocity almost that of light.

(e) Ultra-violet rays. This is the narrow band of radiation that is just beyond the visible range on the violet end of the spectrum, just as the infrared ray is on red part of the spectrum. It is this ray that produces sunburn and causes the manufacture of vitamin D in the human skin.

(f) X-ray. This is electromagnetic radiation of very short wave length. They are generated when electrons strike a metal target, usually tungsten. They penetrate through flesh but not through a dense material and are therefore normally used in medical practice for locating bone fractures and dislocation, tumours and lesions.

(g) Alpha rays. These are positively arranged particles emitted spontaneously by most naturally occurring radio-active substances, such as radium or by artificially produced elements like plutonium. These particles are distinguished from other rays in that they have little penetrating power and have lower velocity than other particles emitted by radio active elements.

(h) Radar. This is a method of detecting and positioning objects by means of reflected radio waves independent of the object that reflects them. They are mostly used to detect and locate flying aeroplanes and ships on the sea in the dark. Fog and darkness has no effect on the radio waves, therefore detection and location is possible at any time of the year.

Q. 28. (i) How would you compare the illuminating power of an electric filament lamp and a candle?

(ii) Which of these are metals, which non-metals?

Calcium, silicon, antimony, iodine, manganese, vanadium, bromine.

(iii) What is red lead made of? To what uses is it put?

(iv) What is deep X ray therapy?

(v) What are electrons : protons and neutrons?

(vi) What is radio therapy?

(vii) What is a light year? How many light years away is the nearest star to our earth?

(viii) Why do springs issue from the ground? Explain why water sometimes gushes out from the top of a boring.

(ix) A leaking car radiator loses far more water when hot than when cold. Why?

(x) Diamonds, sapphires and rubies keep their lustre for ever. Why?

Ans. (i) This is done by the well known grease spot method.

If we make a grease spot on a piece of paper, and hold it so that light falls on one side of it from an electric lamp and on the other from a candle.

If now the two sources of light are at such distances that the greasy spot is almost invisible because the light lost by one side by

going through the grease-spot will be made up for by the light which comes through the spot from the other side. Now since the intensity of the illumination of a surface varies inversely as the square of its distance from the source of illumination, therefore if we measure the distance of the arc lamp and the candle from the grease spot we can at once measure the intensities of light coming from them both.

(ii) Metals	Non metals
Calcium	Silicon
Antimony	Iodine
Manganese	Bromine
Vanadium	

(iii) Red lead is lead-heated in air or oxygen till it becomes an oxide of lead—the well known red powdery lead tetroxide.

It is used in making storage batteries, glass, red pigments, red paints and is also used in plumbing.

(iv) It has been noted by medical practitioners that living cells are more resistant to X rays than malignant ones, so that deep seated growths may be successfully attacked and often disposed or destroyed by exposing them to X rays. This is deep X ray therapy.

(v) **Electrons** are fundamental particles of electricity and matter carrying a negative charge. Electrons exist in all atoms as planetary particles revolving round the nucleus.

A Proton is a positively charged nuclear particle which forms part of the nucleus of an atom.

Neutron is the fundamental particle of matter forming part of the nucleus of an atom having no electric charge on it.

(vi) **Radio therapy** is treatment of diseases by radiation. Deep X ray therapy is one of these. Others are the use of penetrating gamma rays given off by radium salts and radium. They are used against tumors and malignant growths. Beta rays from radium salts are used for superficial conditions.

(vii) **Light year** is the unit of distance based on speed of light, which is 186,000 miles per second. Light year is thus approximately 5.87 million miles. It is used for measurement of space.

An object is one light year distant when its light takes one year to reach an observer.

The nearest well known star is Sirius, the famous dog star. It is 8.6 light years from our earth.

(vi.i) A **spring** is natural uprush of water from a single point in the ground, often at the foot of a hill or cliff. It is generally caused by a layer of dense rock which prevents the rain water that

falls on the hill from soaking away. The water finds its outlet by means of the spring.

Water may be under great pressure, and finding an outlet gushes out as a spring.

In volcanic areas they gush out as natural hot water.

If a porous layer in an undulating form is trapped in between two non porous layers, rain water falling on the porous layer soaks it and remains trapped under great pressure of the non-porous layer of rock above the porous layer of rock. Now if a hole is bored through the non porous rock, till it reaches the porous rock below, the trapped water under pressure, will at once gush out with force through the boring. This is the reason why water sometimes gushes out from the top of a boring.

(ix) This is because hot water is much less viscous than cold water, hence hot water will flow away through a leak more rapidly than cold water.

(x) This is due to the fact that materials like the diamond, rubies and sapphires are so hard that they do not wear away or even become slightly scratched. Hence they keep their polish for ever.

Q. 29. (a) When has water the heaviest density ?

(b) What is the normal temperature of a man ? Why do doctors use a clinical thermometer and not any other type of thermometer to take the temperature of a patient ?

(c) Why does a flying kite on a string remain motionless in a steady wind ?

(d) Why does not the skin burst when it becomes fat ?

(e) What will happen if you bore a hole into your electric lamp and next switch on the current ?

(f) Of which substances are the following made ?

(1) Diamond (2) Graphite (3) Lead pencil (4) black soot (5) turpentine (6) Shellac (7) Sacharine (8) nylon (9) Lenoleum (10) Glue (11) Chocolate (12) Rope.

Ans. (a) At 4°C.

(b) 98.5°F. Doctors use a clinical thermometer because in the first place it is so very handy to carry, its range being only between 95°—110°F, the degrees between which human temperature can range. Therefore any other type of thermometer will not do. Also, since, due to its very fine boring, the mercury rises considerably even by the slight rise of temperature of the patient, his temperature readings are quickly and accurately taken. Even the rise or fall of two or three degrees soon indicates to the doctor the condition of the patient.

One other advantage of this type of thermometer is that since it has a fine construction which does not allow the mercury to run back to the bulb soon after it is taken from the mouth of the patient, hence the reading of temperature is very quick and accurate.

(c) A kite on a string remains motionless in a steady wind because the pull of the string holding the kite, the weight of the kite and the pressure of the wind exactly balance each other.

(d) Because the skin is very elastic. If it were rigid it would have burst, but it does not do so on account of its elasticity.

(e) There would be a loud bang as the air will rush in to fill the vacuum.

Next, if the current is switched on, the filament will soon tarnish on coming in contact with the oxygen of the air and the bright light will get dimmed.

(f) 1. Diamond is pure crystalline carbon, the hardest substance known.

2. Graphite is a crystalline form of carbon.

3. Lead pencils are pencils containing graphite.

4. Black soot is vaporised carbon by burning wood or any other carbon compound.

5. Turpentine is crude or distilled liquid derived from the resin of pine trees or other coniferous trees.

6. Shellac is the purified form of lac in the form of flakes.

7. Saccharine is a white crystalline solid obtained as a coal-tar product from toluene.

8. Nylon is a trade name for a class of strong, elastic synthetic resins. It is made from derivatives of coal, air and water.

9. *Linoleum*. This is a material which is made by impregnating a strong and heavy canvass with the special material to serve as a cement on the canvas. This cement is made of oxidised linseed oil, mixed with resin, and ground cork etc.

10. Glue is derived from boiling bones, fish, offal, hides and skins etc.

11. Chocolate is a food product made from the cocoa bean which is a fruit of a tropical tree found mostly in the West Indies, Java, Ceylon, South America etc.

12. The ordinary rope is made of jute fibres.

Q. 30. (i) What is horse power ?

(ii) Will you fall backward or forward in a bus ? Give your reasons.

(a) If the bus were to start suddenly from a position of rest.

(b) If the bus were to come to a sudden stop while running at high speed.

(iii) What is unit of measurement of heat energy ?

(iv) At what temperature does the Fahrenheit thermometer give the same reading as the centigrade thermometer ?

(v) Why would ink rise to the top of a blotting paper, were you to immerse only its lower edge in it ?

Why would it not rise similarly if you were to use instead glazed paper ?

(vi) How does sap reach the topmost leaves of a tree ?

(vii) Why do huge blocks of ice which can shatter even iron ships to pieces float on the surface of oceans in the polar regions ?

(viii) Why are stars visible during the night and not during the day ?

If there were no atmosphere round the earth and if life were still possible, what would be the colour of the sky ? Would man be able to see the stars then ?

(ix) Why is salt mixed with ice in an ice freezer ?

Ans. (i) Horse power. This is the unit of measurement of the rate of doing work or supplying power. It is defined as the work done at the rate of 500 foot-pounds per second or as the power required to raise 33,000 lbs, one foot in one minute.

Thus an engine which is developing 33,000 footpounds of energy per minute is said to be working at one horse power.

It is also equivalent to 746 watts.

(ii) (a) We will fall backward, because our feet will suddenly get motion, while the rest of the body is in a state of inertia. The feet will be carried forward while the body will fall backward.

(b) In this case the feet will come to rest all of a sudden, while the body will have the previous motion of the bus on it. We will thus fall forward due to the previous motion on the body.

(iii) Calorie,

(iv)—40°.

(v) Due to capillarity in the blotting paper. It will not rise in a glazed paper; because there is no capillarity in it.

(vi) Sap (the fluid of plants consisting of water and dissolved plant foods etc.) enters through root hairs by osmosis (which means that if a solution, say of sugar in water is separated from pure water by a thin membrane, water will pass through the membrane into the solution). In general, substances will diffuse through a permeable membrane from a solution where they are more concentrated to one where concentration is less. It is then carried up by vascular tissues i.e. the porous, tubular part of the wood, to parts containing chlorophyll, which are usually the leaves. Thus according to scientists sap ascent is caused by osmotic pull from higher concentration in the roots to the leaves of the trees after the loss in the leaves of water by transpiration and to some extent from osmotic pressure arising in the roots of the plants.

(vii) Because volume for volume ice is lighter than the water on which it floats. It submerges as much as the water it displaces by its weight, the remaining keeps above the surface. Hence even huge blocks float on the surface of the oceans.

(viii) We do not see the stars during day time because of the atmosphere around the earth. The atmosphere breaks up and scatters the sunlight into the blanket of extreme brightness through which we cannot see the distant faint stars. This brilliant blanket is removed during the night, hence the stars become visible.

If there were no atmosphere on the earth, the colour of the sky will be pitch black and the stars will be visible.

(ix) Salt absorbs the latent heat of fusion while mixing with ice, hence it lowers the temperature of the solution which is what is required by the ice freezer.

Q. 31. (i) Why does a pool of water look shallower than it actually is ?

(ii) If you were to place a coin in a pan and stand at a distance where it just becomes invisible to you and then someone were to pour water in it, the coin will become quite visible to you. Why is this so ?

(iii) Smugglers often gulp down contraband gold or diamonds. How does the police who suspect them to have done so, test this ?

(iv) What is the chemical name of (a) Plaster of Paris (b) Caustic soda (c) the common salt (d) washing soda (e) Epsom salt (f) carbolic acid gas (g) Bleaching powder (h) Glauber's salt (i) Alum (j) Chalk (k) Sal Ammoniac (l) Aqua regia (m) Calomal (n) Borax.

(v) Why is it dangerous to sleep under a tree at night ?

(vi) In sandy deserts travellers are often deceived by seeing inverted images of trees and think they are nearing a lake, while there is none. What is the cause of this phenomenon?

(vii) Why is it comparatively easier to swim in a sea than in a river?

Why does nobody get drowned in the Dead Sea in Palestine?

(viii) Why does a man lean forward while climbing and bend backward when trying to run down the steep slope of a hill?

(ix) A rainbow is never seen even on a cloudy day except after rain. Why?

Ans. (i) This is due to the fact that as a result of refraction of rays of light coming from a denser to a rarer medium the apparent depth is found to be less than the real depth of water.

(ii) This is due to the fact that light rays emerging from a thicker to a rarer medium bend outward. Hence light rays emerging from the coin get so oblique that they reach the eye of the observer, and he sees the coin, on water being poured into the jug, where he could not see it before.

(iii) This is detected by X-rays of the stomach of the smuggler. The gulped up foreign body will become visible on the photographic plate after the X-ray of the part.

(iv) (a) Plaster of Paris	→	Calcium sulphate hemihydrate ($2\text{Ca SO}_4 \cdot \text{H}_2\text{O}$)
(b) Caustic Soda	→	Sodium hydroxide (NaOH)
(c) The Common Salt	→	Sodium chloride (NaCl)
(d) Washing Soda	→	Sodium carbonate decahydrate ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$)
(e) Epsom Salt	→	Sodium sulphate heptahydrate ($\text{Mg SO}_4 \cdot 7\text{H}_2\text{O}$)
(f) Carbolic Acid	→	($\text{C}_6\text{H}_5 \cdot \text{OH}$)
(g) Bleaching Powder	→	Calcium hypochlorite (Ca_2OCl_2)
(h) Glauber's Salt	→	Sodium sulphate decahydrate ($\text{Na}_2 \text{SO}_4 \cdot 10\text{H}_2\text{O}$)

(i) Chalk	→	Calcium carbonate (Ca CO_3)
(j) Sal Ammoniac	→	Ammonium chloride ($\text{NH}_4 \text{Cl}$)
(k) Aqua Regia	→	Mixture of 1 part of concentrated nitric acid to 3 or 4 parts of concentrated hydrochloric acid.
(l) Calomel	→	Mercurous chloride (Hg Cl)
(m) Borax	→	Sodium borrate ($\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$)

(v) Because plants exhale carbon dioxide and other noxious gases at night time.

(vi) This is due to the phenomenon called mirage. In the sandy deserts since the air becomes much heated, just near the surface of the sand while the air above is comparatively cooler, therefore the rays of light from, say a palm tree in the desert, is gradually bent, until the angle at which it enters the hottest air is so small that it is totally reflected. It then rises till it meets the cool air. Consequently the eye sees an inverted tree like a reflection in water. The sky too is reflected from the layers of hot water and the bright reflection is so like water that the traveller is misled to believe that he is nearing water.

(vii) The sea water contains salt and other kinds of dissolved matter in it, while river water is practically crystal clear except during rains. Hence the specific gravity of sea water is much higher than river water, and being denser it is easier to float in sea water than in river water.

In the Dead Sea, there is great evaporation of water due to its being below the sea level and it is also in a hot region. Hence it has very high salt contents in it. Its specific gravity is so high that a man does not get easily drowned in it.

(viii) When climbing up, the centre of gravity of his body is beyond the back of his body, he, therefore, leans forward to keep the centre of gravity within the body so as not to fall backward.

Reverse is the case when running downhill.

(ix) Rainbow is formed by the refraction of light of myriads of water droplets. Before rain they are absent in the air, hence even if the day be cloudy, rainbow is never formed.

Q. 32. (i) Why is it more difficult to boil an egg on a high mountain than on the plain below ?

(ii) Mountaineers who go to climb high Himalayan peaks take cylinders full of compressed oxygen with them. Why?

(iii) What is a parachute ? Of what is it made. For what is it used ? Why is there a round hole near the top of a parachute ?

(iv) It may be snowing on a mountain peak, while just at its feet, the plain may be unbearably hot. What could explain this strange phenomenon ?

(v) We begin to pant while going vigorously up a hill, and our pace is very slow, while we swiftly go down the hill without any effort. What could explain this opposite experience ?

(vi) It has been observed that a balloon filled tightly with a gas begins to expand as it rises high. Why should this be so ?

(vii) Why are balloons now filled with helium and not with hydrogen, though the former is heavier than the latter.

(viii) What is a short circuit?

(ix) What is the substance called which speeds up a chemical reaction ?

(x) What is the law called which states that at constant pressure any gas would expand $\frac{1}{273}$ of its volume for every degree centigrade the temperature is raised?

Ans. (a) (i) This is because due to rarefaction of the air, the air at high altitudes cannot retain as much heat as in denser layers in the plains. Hence the boiling point at high altitudes is much lower than in plains. For this reason boiling of an egg is much more difficult than in the plains.

(ii) Due to increased rarefaction of air on the mountain, there is much less oxygen available for breathing than in the plains, hence it becomes very much difficult to breathe up there. So mountaineers have to carry solid oxygen with them to make normal breathing and sufficient intake of oxygen possible.

(iii) Parachute is a cloth (may be silk or nylon) device, which is commonly folded in a prescribed fashion. It opens at once into a large umbrella shaped device, when it is properly "ripped," and is also acted on by air currents.

It is used for emergency landing of people and equipment from an airplane, as for example during wartime or during military manoeuvres or when assistance has to be dropped from the airplane to isolated communities.

The hole at the apex is an automatically adjustable hole for allowing air through, for otherwise due to upward gusts of air, it may become difficult to come down quickly.

(iv) This is due to the fact that in very high mountain peaks the air gets so rarefied that it is unable to retain heat. Winds carrying moisture may soon form into a cloud, which due to the great cold may begin to snow.

On the plain below due to thickness of the air mass above it, the heat retaining capacity of the air is very great. Therefore it may be very hot there.

(v) When we begin to climb up a mountain, the pull of gravity goes on increasing upon us. If we climb up very vigorously we act vigorously against this pull, to overcome which we have to put in great bodily effort. This great exertion, just like fast running causes us to pant.

While running down a hill, it becomes an effortless affair, for as the pull of gravity is downward, we have not to act against it but rather with it. The downward pull of gravity makes us run fast.

(vi) The balloon will begin to expand because the gas inside the balloon exerts an outward pressure and as the balloon gets high up, the air gets rarer and rarer. The outward push of the enclosed gas on the inside walls of the balloon makes it expand on account of the decreased pressure put by the rarefied air on the outside surface of the balloon.

(vii) Because helium is an inert gas, while hydrogen easily catches fire.

(vii) **Short Circuit.** This term is used for a broken electric circuit as when a fuse blows out or when the connection wire in the circuit is broken and two wires joining together make a small circuit which offers greater resistance to the flow of electricity so that the great heat so generated may cause a fire.

(ix) Calatyst.

(x) Charles' Law.

Q. 33. (i) What is a shooting star?

(ii) What is pasteurization? How is it done? Who invented this process?

(iii) What is a transformer? To what uses is it put?

(iv) What is candle power? On what is it based?

(v) You might have often heard of police tear-gasing rowdy crowds. What is the material of which the gas is made?

(vi) What is plumbago? To what uses is it put?

(vii) What parts of the body are affected by the following diseases:

(a) Pleurisy (b) pneumonia (c) gonorrhoea, (d) Tuberculosis (e) Typhoid (f) Infantile paralysis, (g) Goitre, (h) Appendicitis?

Ans. (i) Shooting stars are small meteorites, hurtling through space at great speed which become visible to the eye as soon as they enter our atmosphere, because friction with the air causes them to blaze to a white heat. They are thought to be fragments of disrupted comets.

(ii) Pasteurization is the process of sterilizing milk or other liquids. This is in fact the destroying of the majority of micro-organism (i.e. bacteria) in these liquids. Milk is heated to a temperature of about $63-65^{\circ}\text{C}$, maintaining it for half an hour and then rapidly cooling it to about 10°C or lower and then it may be hermetically sealed if wanted to be kept for long, that bacteria may not affect the milk again. While some organisms remain, the bulk get destroyed and the flavour of the milk is not seriously affected.

(iii) Transformer. This is an electromagnetic device that converts AC (alternating current) to a higher or lower voltage by induction.

(iv) Candle power is the unit for the measurement of the intensity of a source of white light.

Initially the standard for this unit was a vertical candle made of spermaceti wax about 1 inch thick, weighing six to the pound and burning at the rate of 120 grain per hour.

[Note. Now by international agreement made in 1941, the candle power is defined as one sixtieth of the luminous intensity provided by 1 square centimeter of a "black body" at the temperature of melting platinum.

Now a-days however the Vernon Harcourt Pentane lamp is regarded as the standard. It is being defined as ten candle-power].

(v) Tear gas is the chloropicrin gas made from bleaching powder and picric acid. It has great irritating action on the eye which brings about profuse tears; hence its use for quelling riots.

(vi) Plumbago is nothing but pure graphite in a crystalline form.

It is principally used in the manufacture of crucibles for the metallurgical industry, for carbon goods (e.g., batteries, brushes, pencils etc.) and as lubricants and polishes.

- (vii) (a) *Pleurisy* : The pleura, which is a shiny covering layer enclosing the lungs.
 (b) *Pneumonia* : The lungs.
 (c) *Gonorrhea* : The genital organ.
 (d) *Tuberculosis* : Lungs.
 (e) *Typhoid* : The small intestine.
 (f) *Infantile paralysis* : Nerves and nerve centres in the body.
 (g) *Goitre* : The thyroid gland in the neck.
 (h) *Appendicitis* : Appendix vermiform, near the lower right abdomen.

Q. 34. What is the function in the body of:—

1. Saliva
2. Gastric juice.
3. The villi in the small intestine.
4. The gall bladder.
5. The kidneys.
6. The Pancreas.
7. The Liver
8. The spleen.
9. The thyroid gland.
10. The Larynx.
11. The Lungs.
12. The spinal cord.
13. The skin.
14. The skeleton.

Ans. 1. Saliva. serves to moisten the inside of the mouth and throat and turns the food into a semi-liquid form to go down the gullet, while the ptyalin and the other enzymes it contains help to predigest food, especially its starches before it passes into the stomach.

2. Gastric Juice. This is the digestive juice present in the glands in the stomach. It contains hydrochloric acid, the enzyme called reskin which curdles milk and the other enzyme pepsin which acts on proteins in the acid medium. Thus protein contents of the food are converted into a digestible body called peptone.

3. The villi in the small intestine. They are finger-like projections in the inner wall of the small intestine. The function

of these villi is to suck in the digested food and as they are lined with a network of tiny vessels, the capillaries, this digested food is taken in by the capillaries and ultimately passed into the bigger blood stream in arteries.

4. The gall bladder. The gall bladder stores the bile manufactured by the liver. This bile aids in emulsification, digestion, and absorption of fats.

5. Kidneys. The function of the two kidneys in the human body is to excrete waste products obtained from the blood in the form of urine. The urine normally contains the nitrogenous waste products of the body.

6. The pancreas. This organ which is a gland near the stomach secretes both pancreatic juice, which is an alkaline liquid necessary to the digestion of fats, proteins and carbohydrates of the food in the duodenum and it also produces insulin for the proper utilization of sugar in the blood stream.

7. The Liver. The function of the liver—a deep red two lobed organ in the upper right part of the abdominal cavity—are many fold. 1. It stores and releases sugar to the blood. 2. It manufactures bile, which is an important digestive juice, specially helping in the breaking down of fats. 3. It prepares fats and proteins for oxidation. 4. It destroys worn out red blood cells and manufactures red blood cells in the growing child. 5. It produces lymph and a protein essential for blood clotting. 6. It stores vitamins A and D.

8. Spleen. Its main function is to serve as a reservoir to supply the digestive system and muscles with bile during increased activity and also helping in the destruction of waste red blood corpuscles producing fresh ones and the production of lymph.

9. The Thyroid gland. This gland manufactures the iodine-containing hormone *thyroxin*, which controls the rate of metabolism in the human body. Its deficiency causes the disease goitre, while its over-production causes many ailments like blood pressure, over tension of nerves, increased irritability, tremors, protrusion of the eyeball etc. etc.

10. The Larynx. This is the funnel-shaped structure leading from the throat to the windpipe. It contains our vocal cords. It is thus our organ of voice.

11. The Lungs. These are a pair of spongy organs situated in the chest. They are organs of our respiration. Through the air sacs in the lungs air containing oxygen is supplied to the blood, while water and the waste product, like carbon dioxide received from the tissues through blood is expelled out.

12. The Spinal Cord. This is a whitish cord encased in the spinal column.

It serves as a pathway for impulses to and from the brain and as a system (of reflex actions) that controls activities of glands, organs and muscles of the body.

13. The Skin. The skin performs manifold functions. It serves as a protection to the inner organs against the injurious effects of excessive sunlight, heat and severe cold. It is a powerful excretory organ, for it goes on constantly pouring out water products of the body in the form of sweat and moisture. It also regulates the body temperature and assists in respiration. It is our great sense organ of touch, pain, temperature etc.

14. The Skeleton. The skeleton serves many purpose in the body. It supports the whole of our body. It is a rest or a framework for containing our flesh, fat and organs. Certain of its bones serve as levers on which muscles act. To majority of the muscles it serves for attachment.

Q. 35. (i) What is the speed of light? How has it been determined by observation of heavenly bodies?

(ii) A cartfull of hay would topple down more easily than one filled with a metal of the same weight. Why?

(iii) What is the hypo of the photographer? What is meant by his negative plate?

(iv) Why are copper wires used in electric wiring in preference to those of other metals?

(v) Who is the scientist who is the originator of modern painless surgery? How did he make this possible?

(vi) Who is the scientist with whom is associated antiseptic surgery?

(vii) Who is the scientist who proved that fermentation is produced by microscopic animalcules called bacteria?

(viii) Who is the scientist who proved that it is the anopheles mosquito carrying the malarial parasite that bites man and causes malaria in him?

Ans. Light travels at the speed of 186,000 miles per second.

This is calculated by observing the movements in the heavens of the planet Jupiter and its moons. Jupiter like other planets revolves round the sun, and its moons like the moon of our earth revolve round it. We are able to calculate to a second the moment when these moons should pass behind this planet and be eclipsed. If now we base our calculations on observations made when the Earth is at its nearest to Jupiter, we find that six months later, when our earth is at its farthest from Jupiter, Jupite moons are 16 minutes late. This sixteen minutes is the time that light takes to traverse

the distance of 186,000,000 miles of the Earth's orbit. The simple division of 16 minutes by this distance gives the speed of light.

(ii) The centre of gravity of a cartfull of hay is not at its lowest point. It may be higher from its base than that of a cart containing a solid piece of metal, for the weight of the solid metal piece being concentrated in a small space, its centre of gravity will be near the centre of gravity of the cart, hence since the combined centre of gravity is at the lowest point, there will be no question of toppling over in this case. But in the case of the hay, the higher point of centre of gravity may make the hay cart topple over.

(iii) The "Hypo" of the photographer is sodium thiosulphate ($\text{Na}_2\text{S}_2\text{O}_3$). When a photographer develops his plate by immersion in a reducing solution, it is found that varying amounts of finely divided metallic silver construct an image or picture of the object. Since the lighter parts of the object produce the greatest effect on the plate, the picture is called a negative, having darker parts representing lighter portions of the object and *vice versa*.

(iv) Because they are much cheaper than wires of other metals. Silver is a better conductor, but it is much dearer.

(v) Sir James Sampson with chloroform.

(vi) Lister.

(vii) Pasteur.

(viii) Sir Ronald Ross.

Q. 36. (i) How is sound transmitted over the telephone?

(ii) How are pictures of scenes enacted at great distances transmitted by the television apparatus?

(iii) How do the radio waves locate a flying object in the darkness of the night?

(iv) Who is the astronomer who first stated that the orbit of each planet is an ellipse?

(v) It is said that the sun contains many of the elements found on earth. How has this been determined?

(vi) What are the diameters of the earth, the moon and the sun?

It is said that the diameter of the sun is more than hundred times that of the earth, yet on the whole the sun is not much heavier than the earth. How is this so?

(vii) What are cold blooded animals? Name some of them.

(viii) Why is mother's milk better for a child than that of a cow or buffalo?

(ix) What is the use of hair to man or animals?

(x) What is the source of power in the muscle of an animal or human being?

Ans. (1) Upon raising the telephone an electric current flows in both the transmitter and the receiver. The transmitter is a microphone with an aluminium diaphragm which vibrates in unison with the speaker's voice. Attached to the diaphragm centre is a "button" filled with compressed carbon granules. Vibrations of the diaphragm vary the degree of compression causing the resistance of the granules to fluctuate. Similarly fluctuating currents are set up and these electrical reproductions of sound waves are conveyed by wires to the distant listener, whose receiver contains a small electromagnet which vibrates in sympathy with the pulsating currents and converts them into sound.

Thus we see that sound currents at the transmitting telephone are converted into electric currents and again into sound currents at the receiving telephone.

(ii) In television images of an actual scene or moving picture of a scene are transmitted over long distances by high frequency radio-waves or coaxial cables.

Just as in the radio sound waves are converted into electrical waves and at the receiving end they are reconverted into the original sound waves, similarly in television the basic equipment is an agent that converts the optical properties of the original scene to be transmitted into an equivalent electrical form and then at the receiving end there is the agent that reconverts the electric form into light.

The stages of this process are the following :—

1. The image of the scene to be televised is focussed by means of a lens to a photoelectric cell which emits electrons in proportion to the light intensity of the scene.

2. The next stage of the process is what is called the "scanning" (i.e. treating each part of the scene separately so that minute parts of the picture are transmitted in orderly sequence) of the photo-electric image so that the electric charges from separate picture elements are collected one after another in rapid succession.

3. The electric currents so produced are amplified many thousand times by means of amplifiers. They are then applied to a radio-transmitter and transmitted as radio waves.

4. In the receiving set the dissected images are reconstructed by the changing electrical impulses back into light value. We thus have our television picture and sound of the original scene.

This is done in a cathode ray tube and an associated scanning equipment consisting mainly of an electric beam which scans the

inner surface of the beam at a rate synchronizing with the rate of transmission of scanning beam of electrons at the transmitting end.

(iii) To detect and locate a distant flying enemy aeroplane, what is to be done is to flood the suspected aeroplane with radio waves. Ground detectors are then used to pick up the reflected beam and it is then possible to determine the direction of arrival of the reflected waves and thus the direction of the radio-located object with respect to the ground station.

The distance along that direction may also be determined by timing the journey of the radio waves to the reflecting object and back. Radio waves travel with a speed of 186,000 miles per second, they travel therefore to and from an object, say 100 miles off, in about one-thousandth of a second. It is the accurate and speedy measurement of time intervals of this order which is the basic feature of the radio measurement of distance. As this is now possible there is no difficulty in locating the distant moving object like an aeroplane.

Darkness, fog or any other thing has nothing to do with this detection and measurement.

(iv) Kepler.

(v) This has been surmised from analysis of the well-known **Fraunhofer Lines** in the solar spectrum.

If analysis of the solar spectrum is made with the help of a spectroscope, one would observe a large number of strong and weak lines. These weak lines are the Fraunhofer lines. These lines in the spectrum's colour band represent the different materials in the object producing the light. It has been observed by scientists that any body making similar experiments can observe—that each material on this earth has its own particular fraunhofer lines. These same lines are also observed in the solar spectrum. This clearly demonstrates that the sun (and the stars) are made of similar materials and substances found on our earth.

(vi) Diameter of the earth 7926 miles (at equator)

 " " " moon 2160 "

 " " " sun 86400 "

The sun is mostly composed of gaseous matter, hence it is not much heavier than our solid earth.

(vii) Animals whose body temperature changes with the change in temperature of their surroundings are called cold blooded animals. Examples : fish, toads, reptiles.

(viii) Bovine or buffalo milk does not contain substances in the proportion in which it is easily digestible by a newly born child, but more specially because a cow's milk or that of a buffalo contains germs, specially the tubercle germs which can prove harmful to an infant, while the mother's milk is free of harmful germs.

(ix) Hairs in animals and man are for protection and the shedding of unwanted water ; they act as thatch. Also they aid in temperature control in animals having furs on their bodies. Grease producing glands open into the sockets of the hairs to make the skin water-proof.

(x) The source of power of the muscles is the combustion of a sugar known as glucose or grape sugar. To supply the muscles the blood carries sugar to them in small but constant amount.

- Q. 37. (i) What is the Urinary system made of? Of what use is it to man or animal ?
- (ii) Why does not the leaning tower of Pisa topple over ?
- (iii) Name some of the most important minerals essential to life. Describe the function of each.
- (iv) Why is water so very essential in our diet ?
- (v) What is roughage ? Of what use is it to man or animals ?
- (vi) What are proteins ? Why are they so very essential in our diet ?
- (vii) What is a hybrid ? Name well known hybrids ?
- (viii) The large intestine is often said to be a death trap for man, for millions of microbes flourish in it and it manufactures malodorous and poisonous materials, which, if they were to get into blood, would cause ill health. Of what use then can the large intestines be to man ?
- (ix) How much food does a normal man require per day to remain in health ? How much food does a growing child require ?
- (x) What do you mean by the central nervous system in man ? State in brief the part played by each in controlling the various parts and organs of the body.

Ans. The urinary system consists of two kidneys, a bladder, and two ducts each called a ureter, one going from the right kidney to the bladder and the other from the left kidney to the bladder.

The kidneys secrete in their outer zone, waste, watery product of the blood called urine, which passes through the ureter tubes into the bag like bladder where it is stored and expelled when wanted. But for the urinary system, waste products contained in the urine would not be eliminated.

(ii) Because its centre of gravity is within its base.

(iii) The most important minerals in our food are : calcium, iodine, iron, sulphur, nitrogen, phosphorus and sodium.

Calcium is essential for strong bones and teeth; it also regulates our heart beat and blood clotting.

Iodine saves us from goitre which is common among people whose diet lacks this element.

Iron is an essential constituent of our blood. Its deficiency causes anaemia. Sulphur forms an essential part of the protoplasm of our body. Nitrogen forms part of proteins, the taking of which is essential for the formation of the body's tissues.

Phosphorus is an important constituent of bones. It is also a constituent of protoplasm and it is therefore essential to life.

Sodium is one of the constituent of the common salt table which is an essential ingredient of our food, for without salt we will feel cramps, fatigue etc.

(iv) Water serves as a solvent of the different parts of our food and makes it liquid so as to be easily absorbed by the villi in the small intestine and as flush in the system.

(v) Roughage is the term applied to the indigestible parts of our food e.g., the woody fibres of plants we take in. They stimulate the stomach and intestine to get a move on.

(vi) Proteins are highly complex nitrogenous compounds making essential components of all animal and vegetable organs. They are essential in our diet for they form the most nourishing part of food we take. They build our tissues and glucose of the blood is derived from them which is the source of our energy.

(vii) A hybrid is product of cross breeding between two different species or varieties of animals and plants. A pony is a hybrid. In plants example is loganberry derived from a cross between blackberry and a raspberry.

(viii) The large intestine has many uses in our digestive system. In the first place it absorbs some water and it acts as a reservoir. If it did not absorb water man would suffer from diarrhoea all the time. The microbes it incubates make many or all of the vitamins of B complex as they are called and these are absorbed there and are so essential for life.

(ix) A man leading a sedentary life should have as much food as provides him with at least three thousand calories of food energy per day. Men leading active and hard life need food giving four thousand calories of energy.

Children require more food in proportion to their bodies than grown ups, because they have to grow and they lead a more active life in play and work than do adults.

(x) By the central nervous system is meant the spinal cord enclosed in the spine and the brain enclosed in the skull of our head which controls the movements of all the parts of our body ; gives us the sensation of the outer world and all the feeling of touch; pain, pleasure, love or hate etc. we have.

1. The spinal cord enclosed in the spine is concerned mainly with the movements of arms, trunk and legs.

2. The brain is the mass of nerve tissue in the skull. In man it includes : (i) the cerebrum which is the centre of consciousness, sensation and voluntary actions, (ii) the cerebellum is important in co-ordination and regulation of muscles, movements of jaws and eyes, (iii) the medulla oblongata performs the function of government, of salivation, stomach secretion and movements of heart and blood vessel control, also movement of tongue and larynx.

- Q. 38. (i) What is meant by the specific gravity of a substance? Which is the standard substance against which specific gravity of other substances is measured ?
- (ii) What is a plimsol line ? Why are sea-going vessels required to be marked with such a line ?
- (iii) What are primates ? What are their chief characteristics to distinguish them from non-primates ?
- (iv) What are marsupials ? Name some of the marsupials you know.
- (v) Most animals like the dog, cat, bull, even camels and elephants can easily swim in water, but not man. Why is this so ?
- (vi) Explain what is meant by a mean solar day and a sidereal day.
- (vii) Why does a man carrying a heavy load in one hand instinctively bend his body towards the other side ?
- (viii) What is the difference between speed and velocity ?
- (ix) A body tumbles over when you just touch it. Under what conditions will this happen ?
- (x) What is a gyroscope ? Why has it replaced the magnetic compass in modern ships ?

Ans. (i) Specific Gravity. By specific gravity is meant the ratio of the weight of a given volume of a substance to the weight of the same volume of a standard substance.

The standard substance in the case of solids and liquids is water, while air or hydrogen is the standard substance in the case of gases.

(ii) This is a circle with a horizontal line through the centre (this is called the Plimsol Line) which is placed on the side of every vessel to indicate to what depth she may be loaded in salt water. This is done to save vessels getting overloaded, and the possibility of their sinking due to this overloading.

(iii) Primates are the highest class of mammals including man, the apes, monkeys and lemurs.

Their chief characteristics are their convoluted large brain, eyes directed forward, teeth adapted for any food, prehensile limbs etc.

(iv) Marsupials are mammals whose young are born undeveloped and remain for many months in an abdominal pouch of the female. They are kangaroo, wombat, wallaby, opossum.

(v) Because man has a very heavy head in proportion to his body weight. Other animals have a lighter brain as compared to body, hence they can easily swim, not man.

(vi) If the length of all the days in the year be added together and divided by the number of days in the year, we obtain an interval of time which is always the same. Such a day, though an imaginary one, is called mean solar day.

Like the sun, most of the stars rise across the meridian and set. Though the distance of the earth from the stars is so enormously great, yet the time which elapses between two succeeding transits of a star is the same. This interval is called a Sideral Day.

(vii) So as to balance the force of gravity; that he may not have an undue pull on his body on one side only, that is on the side of the load.

(viii) Speed is the rate of movement of a body in any direction.

Velocity of a body is the speed of the body in a certain direction.

(ix) When the body is in a position of unstable equilibrium.

(x) The gyroscope is a heavy disc or wheel mounted in such a way that it is able to rotate freely in any direction.

Its striking feature is that, when set rotating and then left undisturbed, it always maintains the same direction in space inde-

pendently of its relation with the earth, i.e., it refuses to turn with the motion of the spinning earth.

Its other property is what is called precession. This means that when a force is applied to it tending to alter the plane in which it is rotating i.e. tending to change the direction in which it is rotating, the gyroscope resists this force and turns in such a way that the plane and the direction of the spinning disc become the same as those of the applied force.

This property of the gyroscope has been applied in navigation; the gyrocompass is essentially a gyroscope in which the precession due to the force of gravity of the earth is controlled and the axis of the gyroscope automatically maintains itself in a true geographical north south direction.

It thus obviates the difficulties attaching to the use of a magnetic compass in steel ships. Thus this gyrocompass gives greater accuracy in steering and gun fire. For these reasons the mariner's compass has given place to the gyrocompass.

Q. 39. (i) What is the science that deals with ? :—

1. Heavenly bodies. 2. Fossil animals. 3. Carbon compounds. 4. Atmosphere and weather. 5. Properties of light. 6. Sounds. 7. Preservation and promotion of health. 8. Speech sound. 9. Mental life. 10. Aerial locomotion. 11. The sea in all its aspects. 12. Nature and composition of matter and the changes it undergoes. 13. Plants. 14. Insect life.

- (ii) A train starts from a position of rest and then its speed goes on increasing every second. What is this gradual change of speed termed ?
- (iii) A very small rain drop does not fall so fast as a larger one. What is this due to ?
- (iv) Why is walking on a marble floor much more difficult than on a cemented floor ?
- (v) Why will a cyclist move faster on a marble floor than on a cemented floor ?
- (vi) Why will a man move more freely on a cemented road than on one having loose sand ?
- (vii) What is a lactometer ?
- (viii) If from the inside of a thin walled metal vessel you remove the air, producing a vacuum in it, what will happen to it ?
- (ix) It has been observed that acronauts and climbers to the high Himalayan peaks experience great

difficulty in breathing and are troubled with bleeding of the nose and ears. Why should bleeding happen at these heights?

(v) What is an aneroid barometer?

How is the height of a mountain peak ascertained? What is the principle on which the instrument showing this height is made?

Ans. (i) 1. Astronomy, 2. Palaeontology, 3. Organic chemistry, 4. Meteorology, 5. Optics, 6. Acoustics, 7. Hygiene, 8. Phonetics, 9. Psychology, 10. Aeronautics, 11. Oceanography, 12. Chemistry, 13. Botany, 14. Entomology.

(ii) Acceleration.

(iii) This follows the scientific principle that in the case of a falling body when its radius increases its weight increases more rapidly than the air resistance and hence a large drop will fall more rapidly than a smaller one.

Stated in other words, the smaller the drop of water the more is its rate of fall retarded by the air.

(vi) Friction is much less on a marble floor than on a cemented floor. For this reason, though when walking on a marble floor the speed of motion is far greater than that on a cemented floor, but a man on such a floor will tend to fall more quickly than on a cemented floor. Hence balanced walking on a marble floor is much more difficult than on a cemented floor.

(v) Due to lesser friction offered to the tyres of the bicycle by the smooth marble floor, the cycle moves faster on such a floor than on a cemented floor which offers more rolling friction to the passage of the tyres on it.

(vi) In a sandy road the surface due to moving sand gets much indented and therefore the rolling friction increases enormously. Hence it becomes much more difficult to run the cycle on a sandy road than on a hard cemented road.

(vii) A lactometer is an instrument for determining the amount of butter fat in milk. In its usual form it is a graduated glass tube which is filled with the milk to be tested; the latter is allowed to stand until the cream separates, when the amount is read from the scale.

Another method employed to know the amount of real milk and water in it is to determine the specific gravity from readings on the scale on the lactometer.

For water the specific gravity indicated is 1. If the reading shows this specific gravity as 1.031 then it is pure milk, otherwise either it has more water if the specific gravity is less than 1.031 or

there is more solid matter emulsified with it if it is more than 1.031.

(viii) The pressure of air is about $14\frac{1}{2}$ lbs. on each square inch of any surface of plains on the earth. If air has been removed from inside a thin metal vessel and a vacuum created this pressure will be so great as to push the thin outer wall of the vessel inward, like any other great outside force applied on it and distort it.

(ix) The living human being has ever since creation been subjected to the normal atmospheric pressure which is about 2129 lbs. to a square ft. and has been developed accordingly. Aeronautes and Himalayan climbers experience great difficulty in breathing, because at great heights the air gets rarefied and there is not sufficient oxygen in it to supply to the blood and keep the body from getting anaemic.

Also every cell and blood corpuscle is subjected to the normal atmospheric pressure on land and the blood contains air and other gases which tend to be liberated when the pressure becomes less. Under normal conditions the delicate walls of blood vessels are subjected to equal pressure on the outer and inner walls, the pressure of the air being balanced by the internal pressure of the blood and its dissolved gases. But when a man ascends rapidly to regions of lower air pressure, bleeding occurs where his tissues are thin, because the internal blood pressure forces blood out through them.

(x) The aneroid is a special kind of barometer, being a metal box having a vacuum chamber with one or two thin elastic sides. Under external pressure, the chamber tends to collapse moving a linked pointer. This pointer thus registers outside air pressure on the dial face.

As air pressure goes on decreasing with height, the aneroid thus shows the height to which a person has reached in an aeroplane or on a mountain by reading the indications of the pointer on the dial face.

An ordinary barometer also shows this height, for the barometer falls roughly one inch for every rise to the upper region by 1000 ft. until at 3.5 miles above earth's surface the air pressure is one-half that at sea level.

Q. 40. (a) What is the law called which states that the volume of a gas varies inversely as the pressure provided the temperature remains constant?

(b) What is the principle called which states that a body immersed in a fluid suffers an apparent loss of weight equal to the weight of the fluid displaced by the body?

- (c) What is the hypothesis called which states that at the same temperature and pressure equal volumes of different gases contain equal number of molecules ?
- (d) What is the law called that states that the fluid in a closed system exerts pressure equally on all directions ?
- (e) What is the rule called that states that the direction in which a current flows in a generator is directly opposite to the direction in which an electric motor revolves ?
- (f) What is the evacuated space called which is above the mercury column in a barometer tube ?
- (g) What is that method called in which an offspring is born to a female without actual coapulation with a male ?
- (h) What is the temperature called which on the centigrade scale reads—273 degrees ?
- (i) What is the term used for compound metal made of two or more metals ?
- (j) What is the theory called which states that the sun is the centre of the solar system and planets revolve around it in fixed elliptic orbits ?

- Ans. (a) Boyle's Law.
 (b) Archimedes' principle.
 (c) Avogadro's hypothesis.
 (d) Pascal's Law.
 (e) The left Hand rule.
 (f) Torricellian vacuum.
 (g) Artificial Insemination.
 (h) The Absolute Temperature.
 (i) An Alloy.
 (j) Copernican Theory.

- Q. 41. What is (a) Anemometer (b) Angstrom unit (c) Antibody (d) Antiseptic (e) Antibiotic (f) Astigmatism (g) Chlorophyll (h) Photosynthesis (i) Chromosome (j) Cloud Chamber (k) Cosmic rays (l) D. D. T. (m) T. N. T. (n) Deliquescence (o) Fermentation.

Ans. (a) Anemometer. This is a device for measuring the speed of a gas. It is used most specially in meteorology for measuring the speed of winds.

One type called *Brooks or pendulum* measures the pressure of the wind and converts it to speed. Another type is a cup and wind-wave type which rotates in the wind, displaces pointer in proportion to the speed.

(b) **Angstrom unit.** This is the unit that physicists employ to measure wave-lengths of light. One Angstrom unit is one-thousandth of a micron (a micron being one-millionth of a metre.)

(c) **Antibody.** This term means the chemical substance in the blood of animal and man which overcomes germs and their poisons, and thus makes the animal or man immune to the diseases of those germs.

(d) **Antiseptic.** This is a substance that kills germs or prevents their growth. Carbolic acid, cresol, lysol, dettol, formaldehyde, cusol, iodine, mercury perchloride are all antiseptics. Aeriflavine is the best of the antiseptics as it does not injure the body tissues.

(e) **Antibiotics.** These are chemicals produced by molds and bacteria, which without injuring the body tissues of man interfere with the growth of certain bacteria and are, therefore, invaluable in the treatment of microbial infection.

Most important of these are penicillin, streptomycin, aureomycin, tetramycin and chloromycetin.

(f) **Astigmatism.** This is a defect of the eye which prevents light from coming to a point of focus on the retina, thus causing blurred images. This is due to the unequal curvature of the lens or cornea of the eye.

It is corrected by the use of cylindrical lenses.

(g) **Chlorophyll.** This is the green colouring matter in plants.

(h) **Photosynthesis.** This is a highly complex process by which green plants produce carbohydrates (sugars) by synthesising carbon dioxide of the air, and water and chlorophyll in the leaves in the presence of sunlight.

(i) **Chromosomes.** These are thread like bodies contained within the reproductive nucleus of all animal and plant cells. They are clearly seen under a microscope when the cell is in the process of dividing to form two daughter cells.

(j) **Cloud Chamber.** It is an instrument that helps scientists to track atomic particles, like Beta rays, Gamma rays etc. It is based on the fact that a swiftly moving atomic particle leaves a trail of ions on which water vapour will condense invisible droplets. It is called also Wilson chamber after its inventor Charles Thomson Wilson.

(u) Pupa. This is also called the chrysalis stage of an insect when it is quite dormant or quiescent. It is that development stage when it is transformed from the larval form to the perfect insect.

(n) Isotope. This is another form of the same element in which its atoms have the same chemical properties as the original element but different atomic weights.

Q. 43 (i) What is the function of the following glands in the human body? Where are they situated (1) The pituitary 2. The parathyroid 3, The Adrenal.

(ii) When it is mid-winter in the Northern Hemisphere, the earth is nearest to the sun, while at mid-summer it is farthest away from the sun. How is it, that it is so cold in winter and so hot in summer, while apparently the seasons should be the reverse of what they are? What is this contradiction in nature due to?

(iii) What do you understand by the Metric System? On what is it based? What is approximately the length of 1 foot in metres, the length of one kilometre in yards, the weight of one gallon in litres, the weight of one ounce in grams?

(iv) What are echoes? How do they help us to measure the depth of an ocean?

(v) How are bats able to locate an object while flying in perfect darkness?

(vi) On a cold morning a gardener grasps the iron part of his spade with one hand and the wooden part with another. Explain why the iron feels colder to him than the wooden part.

(vii) The glass of an electric lamp gradually becomes warm when the lamp is being used. The space inside is a vacuum. How then does heat reach the glass?

(viii) Describe and explain the principles of a system for heating a building by hot water. What are its advantages and disadvantages? When the room is heated by the hot water pipes above, describe how the heat is transmitted from the furnace to a person in the room.

(ix) When a bulb of a thermometer is immersed in hot water, the mercury thread at first falls slightly and then rapidly rises. Explain why this happens.

(x) You can warm water contained in a bag of paper without scorching the paper. How?

Ans. (i) 1. Pituitary glands. These glands are situated at the base of the brain. They secrete the pituitrin. It has two parts, the anterior and posterior. The chief function performed by the ante-

rior is to regulate growth in the human being, development of sexual characteristic and lactation. The posterior portion affects blood pressure, kidney function and certain muscles.

2. These glands are situated in the two lobes of the thyroid glands near the base of the brain. They produce a hormone essential for the normal utilization of calcium and phosphorus and their proper balance in the blood and bones.

3. The Adrenal glands are situated at the top of the kidneys. Each has two parts. The outer part secretes a hormone that controls the sodium-potassium balance of the blood and tissues and sugar metabolism. The inner part produces the hormone adrenaline, which increases blood pressure, heart rate and blood sugar.

(ii) During the winter months the Northern hemisphere is bent away from the sun, hence the sun's rays reach obliquely to it. Hence they are longer and spread out on a greater surface of the earth than if they were direct. Therefore even though the earth is much nearer to the sun than in other months, the heat of the sun received on the Northern Hemisphere is much less than in summer when this portion is directly facing the sun. In summer even though the earth is farther away from the sun than in winter, rays falling directly on the Northern Hemisphere make it much hotter than it otherwise should.

We have therefore, cold winters and hot summers. The distance of the earth to the sun does not make much difference.

(iii) The Metric system. This is the system first adapted in France and now by scientists and engineers of all countries, which is based on the decimal system, i. e. all units are related to one another by being multiples and sub-multiples of 10. The system thus makes calculation very simple.

In it the basic unit of measurement is the *metre*, which was originally defined as $1/10,000,000$ th of the distance from North Pole to the Equator, though this is slightly inaccurate. Now for all practical purposes the standard metre is determined by a measured length at 4°C of a registered bar of platinum kept in Paris.

Like the basic unit of measurement, the basic Metric unit of mass (i. e. weight) is the *gramme*, which is defined as the weight of 1 cubic centimetre of pure water at 0°C .

1 foot = 30 centimetres,

1 Kilometre = 1100 yards.

1 gallon = $4\frac{1}{2}$ litres.

1 Ounce = $28\frac{1}{2}$ grams.

(iv) Echo. An echo is the reflection of a sound wave. Thus if we shout at a distant wall, this causes impulses in the molecules of air; these spring back from the wall and cause similar impulses

in the opposite direction, so that we hear back our own sound like the reflection of our face seen in a mirror.

Echoes are used in finding the depth of an ocean. In this method the echo sent from the hull of a ship is recorded on a sensitised paper. The time (which is only a fraction of a second) taken by an inaudible sound wave (i- e. those which have a frequency of 16,000 per second and which are therefore inaudible to the human ear) from the hull travelling to the bed of the ocean and back is recorded. This divided by 2 and multiplied by 1440 metres (which is the speed of sound) gives us the depth in metres. Thus if the time interval is one second, the depth of the ocean is $\frac{1}{10} \times \frac{1440}{2} = 72$ metres.

(v) Scientists have by experiments proved that when in flight bats emit a supersonic note in sharply defined impulses, whose reflection i. e. echo, when detected by their ear, indicates the position of the obstruction to their flight, hence due to these echoes they get clear of the obstruction even in darkness.

(vi) This is due to the fact that though both the metal part of the spade and the wooden part have the same temperature, as a metal is a good conductor of heat, while wood is not, the metal conducts away the heat of our hand and therefore is cold to the touch, while the wooden part of the spade being nonconductor will not conduct it away, hence we will not feel it very cold.

(vii) This is due to the fact that the hot filament of the lamp emits radiant energy which passes through a vacuum. The inside part of the glass bulb receives this energy, hence it gets hot.

(viii) The hot water heating system consists of a furnace at the basement of the house surrounded by a water jacket. From it lead a system of pipes that carry the heated water, by means of convection currents set up in the water in the pipes to pipes in the different rooms of the building. Cooler, heavier water sinks through the pipes connected to the lower part of the boiler and helps push the warm lighter water upward. The radiators in the rooms of the house are thin hollow metal pipes which are shaped to bring a large surface in contact with the air of the closed room. Hot water flowing through the radiators loses much heat to the metal radiators by conduction. The metal conducts heat to the air of the room coming in contact with it and convection currents distribute the heat throughout the room. Some of the heat is also transferred to the room by radiation.

Thus convection, conduction and radiation all play a part in the hot water heating system.

The cooled water which has lost much of its heat, sinks to the bottom again through the carrying pipes and this goes on so long as the furnace is giving out sufficient heat to heat the water.

The disadvantage of this system is that it is quite expensive for poor or even middle class people. Another disadvantage is that it is in no way connected with a supply of fresh air to ventilate the home.

Its advantage lies in the fact that it uses fuel economically. Also, that once the rooms of the house are at a comfortable temperature the hot water system maintains an even temperature.

(ix) This is due to the fact that in the first instance when the bulb is heated it begins to expand at once, the mercury inside it has not yet received the required heat, hence it falls. When the heat is received by the mercury from the glass bulb it begins to expand at once, as its rate of expansion is far greater than that of glass. Hence it then rises rapidly in the tube of the thermometer.

(x) This can be done by continuously moving the paper bag to and fro above the source of radiating heat, so that the paper does not reach ignition point and get scarred. The water receiving the radiant heat will of course, get slowly hot.

Q. 44. (i) Of what use is the pendulum in an ordinary watch?

(ii) A tumbler often "clouds over" on the outside when cold water is poured in it. When and why?

(iii) A man wearing spectacles enters a warm green house. If the outer air is cold he finds that the lenses become quite dim and that they become clear again after sometime. Explain this.

(iv) Why cannot you skate on a smooth steel plate as readily as on ice?

(v) You sometime see a flash of light when a bullet hits a target. Why?

(vi) Why does dew form more readily on a clear night than on a cloudy night?

(vii) Would the stopper of a bottle that has got stuck be easily pulled out if the neck is warmed. If not, why not?

(viii) Why are icebergs frequently seen to be surrounded by fog?

(ix) Why does a block of ice appear to be steaming after a storm of rain on a hot summer day?

(x) The air gets very stuffy over the street, after it has been watered during a hot summer day. Why?

Ans. (i) In the first place the pendulum helps to keep regular intervals of time in the clock by its regular and steady motion and secondly by its regular swing it controls the rotation of the toothed wheel of the clock and so keeps correct time.

(ii) This will happen during summer time. The hot air in summer contains a good deal of water vapour in it. When cold water is poured in the tumbler, the latter gets cold. The water vapour in the air gets cold by coming in contact with it and it appears as dew on the outer surface of the tumbler. It is thus due to this cause that the outer surface of the tumbler gets cloudy.

(iii) The warm vapour inside the green house getting cooled on the cool surface of the spectacle makes it dim. Soon the spectacle takes up the temperature of the room and hence the vapour that has settled down on the spectacle would evaporate and make it clear again.

(iv) The surface of a smooth steel plate has very little retarding friction on it in comparison to the smooth surface of ice, which under the skater's feet develops little grooves. The ice thus offers greater friction to the feet of the skater and makes it more easy to skate on it than on the very smooth and therefore slippery iron plate.

(v) This is due to the great kinetic energy of the ball striking its target turning into heat energy, which due to its great intensity turns into the flash of light seen when the ball hits the target.

(vi) On a cloudy night heat rays radiated by the earth's surface cannot escape into space, for they are held up and are reflected back to earth by the clouds, hence cloudy nights are warmer than clear nights. Hence dew does not form on cloudy nights. On clear nights the heat rays escape readily into space and hence the earth gets cooler and therefore dew forms more readily on such nights than it would on cloudy nights.

(vii) Yes it will be easily pulled out as the neck will expand due to the heat given to it.

(viii) The air full of water vapours gets readily cooled on coming in contact with the surface of the ice—bergs. The water vapours so cooled appear as fog.

(ix) On a rainy day, the air gets full of moisture. It is still more saturated with it than on a cold day. This great amount of moisture in the air when coming in contact with an ice block gets cooled and appears as fog round about the ice block. The block therefore seems to be steaming.

(x) This is due to the fact that the air gets full of warm water vapours as it comes in contact with the sprinkled water that has got hot due to great heat of the heated street by the summer sun. The warmed up air full of warm vapours gets very stuffy.

Q. 45. (i) What is meant by the statement that a ship has a displacement of 20,000 tons?

(ii) Why do balloons rise high in the air? What is the principle working in their upward rise?

(iii) How is the high speed of a ship's turbine geared down to that of its propellers ?

(iv) Why is perpetual motion impossible ?

(v) In cold countries sand is often sprinkled over rails when frost forms on them. Why ?

(vi) What is the friction of gears in machinery ?

(vii) In what different ways is friction reduced in machinery ?

(viii) What is a dyne ? What is a poundal ?

(ix) What will happen to the regular swing of a pendulum if (1) the weight of the bob is doubled (2) the weight is halved, (3) The length of the pendulum is doubled.

(x) When a doctor says that he has not been able to diagnose a disease, what exactly does he mean to say ?

Ans. (i) When we say that a ship has a displacement of 20,000 tons, it means that when it is loaded with cargo upto the plimsol line, she displaces 20,000 tons of the sea water.

(ii) This is due to the fact that the upward thrust of the air—which is heavier than the lighter-than-air gas filled baloon—is greater than the downward thrust of the baloon. It will go on rising till the two oppositely working thrusts get balanced.

(iii) This is done by reduction gearing.

(iv) The efficiency of any machine = $\frac{\text{output}}{\text{input}}$. This is never equal to 1, for the output is always less than the input, due to friction and other causes. Hence if a machine is set in motion, it will never have a perpetual motion.

(v) The friction created by sand while a train is running on the railway line generates heat. This melts away ice and frost on the railway track. Hence sand is sometime sprinkled on railways in cold countries when ice and frost form on the rails. The latter also make the line slippery, while the sand helps to make it less so.

(vi) Gears transform a circular motion at a certain speed to a circular motion at another place, hence their use.

They also transmit motion at right angles. They help also, when high speed is wanted to be reduced to a lower speed.

(vii) By suitable lubricating oils and ball-bearings, as for example, when they are employed between a wheel and its shafts. In bicycles ball bearing make the circular motion of the wheels very easy. Without them, there will be so much friction between the parts of the wheel that smooth cycling will be difficult.

(viii) A dyne is a force that produces an acceleration of 1 cm per sec. per sec. in a mass of one gram.

When a force acting on a mass of 1 lb produces an acceleration of 1 foot per second per second it is called a poundal.

It is equivalent to the weight of $\frac{1}{16}$ oz approximately.

(ix) The motion of the swing will remain the same in both (1) and (2) cases. It will become less as the length of the pendulum increases.

(x) He means to say that he has not been able to ascertain the nature of the disease.

Q. 46. (i) What is the standard gauge for railways? Between what parts of the rails is it measured?

(ii) What is normally the measure of each piece of rail?

(iii) How are rails joined to make provision for their expansion and contraction?

(iv) Why is the outer rail on a curve slightly raised than on a flat land?

(v) Why does a cyclist slow down his cycle when turning round a bend?

(vi) What do you understand by stream lining? Where is it applied most?

(vii) What is the advantage of rotation of crops in agriculture? Give examples of how this is done. What is the use of deep ploughing in agriculture?

(viii) It is found that food canned at high temperature will keep for long periods if airtight. Explain.

(ix) What is the modern theory about the creation of the solar system of which our earth is a part?

(x) During day time does the wind blow from the land to the sea or in the reverse direction? Give your reasons for your statement.

Ans. (i) It is 4 ft., 8 inches. It is measured between the inside of the railway lines.

(ii) It is about 60 ft.,

(iii) The rails are joined together by fish plates with holes slightly larger than the bolts, thus providing for expansion and contraction.

(iv) This is done to counteract a train's tendency to leave the rails when travelling at high speed. This tendency is owing to the effect of centrifugal force.

(v) If he does not do so the tangential force which impels him forward would be greater than the centrifugal force and he would most likely fall forward instead of turning round.

(vi) By stream lining is meant a type of construction which offers the minimum of resistance to air or water which retard forward motion. This is done specially in planes, ships and cars.

(viii) By the rotation of crops the farmer saves the soil from getting exhausted by losing certain ingredients which a crop takes away from it when that particular crop is sown year after year.

An example of a 4-year rotation is a succession of wheat, roots, barley, clover; but this may be widely varied to suit local needs e.g., oats may replace barley, or peas and beans may replace clover.

Deep ploughing brings to the surface fresh and unexhausted soil.

(viii) All bacteria in the food get killed at high temperature. If the food is tightly canned at once, no bacteria will get in and develop to decompose the food contents. Hence such a food will keep fresh for long.

(ix) The most recent view about the solar system is that at one time the sun was one of two stars revolving round each other (that is, each was a binary) and that one of the stars exploded. Its scattered fragments eventually became planets revolving round the star which remained—the sun. This theory has won approval among modern astronomers.

(x) During the day time it is the sea breeze that flows from the sea to the land and not the land breeze to the sea. This is owing to the fact that during day time the heat of the sun does not heat the water of the sea and consequently, the atmosphere over it is not so much heated as over the land. The heated atmosphere over land gets thinner and rises. To fill the partial vacuum created in it, the heavier cool atmosphere from over the sea flows landward and thus we have a sea breeze.

Q. 47. (i) Which part of the eye brings the image of a distant object to a focus on the retina?

(ii) Explain why the colour of a flower is red, while that of its leaves is green?

(iii) How can you prove that biscuit tins and cocoa tins are made of iron and not of tin?

(iv) In a shop brass filings got mixed with iron filings. How can the shopkeeper separate the two?

(v) What do you understand by a warm front?

(vi) What is an atomic pile?

(vii) What is the atomic theory as enunciated by Dalton ?

(viii) With what material does the honey bee build the honey comb ?

(ix) What is the normal heart beat of a man ? How long does it take for the blood to circulate through the body ?

(x) A large accumulation of scrap iron has to be loaded into railway trucks. Is there any method of doing this, other than by hand ?

Ans. (i) The lens of the eye.

(ii) Because the flower reflects the red part of the spectrum of light rays and absorbs the rest, while the leaves reflect the green part of the spectrum of light and absorb the rest.

(iii) If they are made of iron they will attract a magnetic needle towards the direction they are turned. Secondly, if they are scratched with a knife and left in the open they will get rusty. Thirdly if they are rubbed vigorously with a magnet, they will get magnetised and attract iron filings.

(iv) By help of a magnet the iron filings can be separated, for the magnet will attract the iron filings.

(v) By a warm front is meant the line separating a moving mass of warm air from the cold air it is displacing.

(vi) This is the name given to the nuclear reactor, which is the atomic furnace in which atomic fission takes place and variety of radio active isotopes are produced.

(viii) Dalton's Atomic theory states that (1) all matter is composed of extremely minute particles—the atoms—that may exist, (2) all the atoms of an element are identical in chemical behaviour (3) no two elements have atoms of the same weight, but atoms of any element are same in size and weight and unite in simple numerical ratios to form compounds.

(viii) Each worker among the bees has on its underpart eight pockets which secrete wax. This wax is used in building the honey comb.

(ix) The heart beats 70-80 times a minute. The blood takes 23-33 seconds to tour once through the body.

(x) This can be done by a powerful electro-magnet.

Q. 48. (i) Explain why in a thunderstorm (a) a down-fall of rain tends to diminish danger (b) It is most unwise to hold up an umbrella in open country.

(ii) Why does the filament of an electric lamp become hot, while the wires leading to it remain cold ?

(iii) Explain the terms volts and watts Board of Trade Unit.

(iv) Explain why it is easier to cut a cardboard with scissors when it is near to the base of the blades than when it is near to the points.

(v) When a ship passes from the fresh water of a river into the sea does it rise higher or sink lower? Give your reasons for your answer.

(vi) A heavy pendulum is suspended from the roof of a railway carriage and it is stationery. How will its direction be effected (1) when the train starts, (2) when the train is travelling with a constant motion, (3) when the train comes to a sudden stop?

(vii) Why do cricket players when trying to catch a hard hit cricket ball swing their hands?

(viii) After using a clinical thermometer the mercury thread must be forced back into the bulb. Why can this be done by jerking the thermometer downward? Why does not this succeed when the thermometer is held horizontally?

(ix) What is ammonia? To what industrial uses is it put?

(x) What is sal-ammoniac? To what industrial uses is it put?

Ans. (i) After a rainfall the clouds become very thin and the great masses of clouds which produce violent charges in electrical conditions of the earth and a cloud or clouds and of the air between them, and which therefore are the cause of lightning which may fall on a building, tree or a man moving on a plain, disappear. Thus all dangers arising from the lightning are eliminated.

Electrical charges from lightning get pointed to a pointed thing rising above flat ground. Hence it is very dangerous to move about with an umbrella in hand on a plain of an open country. The lightning may fall on the umbrella and kill the man.

(ii) The filament of a lamp is extremely thin, it offers great resistance to the passage of electricity through it. Due to this resistance, some of the energy of the electric current is converted to heat, hence the filament turns hot.

Thick wires do not offer this resistance to the passage of electricity, hence they do not get warm.

light and shade colour etc. In snowy wastes warriors wear white or light coloured clothings. Ships are dazzle painted the purpose of which is usually to make them look as if they are moving in a direction divergent from their actual course. Airfields are camouflaged by various methods such as burning grass in strips on them to appear like shadows cast by hedges in a regular and innocent looking field patterns. False landscapes are created to conceal forts and factories while dummy towns, factories with smoke bulging from them and forts are created to lure bombers to bomb them, while the real ones are made innocent looking.

(iii) The cathode is the negative pole of an electric cell by which an electric current leaves an electrolyte or gas.

It is the opposite of an anode. The anode is the pole opposite to the cathode or it is the positive pole of the cell. It is the pole through which a current enters an electrolytic cell. The anode consists of the electrons or negative ions.

(iv) Cathode rays are a stream of electrons (i.e. fundamental particles of electricity carrying charge) emitted by the cathode (i.e. the negative electrode) in an evacuated tube.

Cathode ray-tube. This is a tube in which electrons are caused to travel at high velocities as in X-ray or television tube.

(v) In plants flowers contain the male and female reproductive organs. In some plants the reproductive organs are in the same flowers, in others they are in different plants.

Anther is the part that contains the pollen, the dust that fertilizes the female cell, while it is the pistil which forms the female part. This pistil is made up of three parts, namely the stigma which receives the pollen and the style which is the passage in the stigma leading to the ovary to which ultimately the pollen goes and by mixing with which the ovules or eggs are developed.

The function of the bees is to carry the pollen which sticks to their feet and wings as they enter the flowers in search of nectar. The pollen is dropped over the stigma and thus the ovary is fertilized.

(vi) The force working on the stone is the centrifugal force, which makes the stone fly away. The stone is held by the centripetal force working through the string.

The cream will be in the centre, while the denser skimmed milk will be forced to the sides.

(vii) Tinplate is iron coated with tin. Galvanized iron is iron coated with zinc, obtained by dipping iron into molten zinc.

Tin plate is chiefly used in motor car manufacture for its wings and under shields, also the tin cans so extensively used for household, storage and other odd purposes.

Galvanized iron is of great use in the manufacture of buckets, wire netting, shed roofs.

(viii) The chief laws of chemical combination are:

1. In a chemical reaction matter is neither destroyed nor created.

2. A chemical compound always contains the same elements united in the same proportions by weight.

3. If two elements combine to form two or more compounds, the two or more weights of the one element that combine with a fixed weight of the other element, bear a simple ratio to one another.

(ix) Gay Lussac's Law of Volumes states that the volumes of gases entering into a chemical reaction bear a simple relation to one another.

(x) Dulong and Petit's Rule : The atomic weight of an element \times specific heat is approximately $=4.4$.

This rule does not hold good for elements of low atomic weights like carbon.

Q. 50. (i) The present day world has often been described as the chemical Age. How far is this true?

(ii) What are weather maps? How are they constructed? Of what use are they? What are isobars on the weather maps?

(iii) Explain what is meant by "synthesis" and "analysis"? Give examples.

(iv) What is cellulose? How is it obtained? What commercial products are obtained from it?

(v) What is starch? From where can it be obtained?

(vi) State in brief Darwin's theory of natural selection?

(vii) State in brief the theory of evolution as expounded by Darwin.

(viii) (a) What is the instrument called by which you can detect and measure an electric current? (b) What is the machine called which converts mechanical energy into electrical energy? (c) What is the chemical cell called which is able to store electrical energy? (d) What is the liquid called which turns blue litmus red? (e) What is the condition of the eye called which makes difficult or impossible to focus light coming from a flat surface? (f) What is the science called that investigates all aspects of living organisms including researches dealing with their structures, composition and behaviour?

Ans. (i) The description of the present day world as the Chemical Age is true to a large extent. "For to the chemist we

Ans. Aluminium is used for machine parts, car bodies, aeroplane parts, pots and pans, wrapping foil, paints, high tension wires.

Zinc is used for galvanizing iron, for the negative plate in an electric cell, to make brass by alloying it with copper and in the die-casting industry.

Tin. It is used to coat iron to prevent it from rusting, which is called tinfoil, in making alloys *e. g.* pewter, solder, bell metal, bronze, type metal etc., as 'silver paper' for wrapping chocolates and cigarettes.

Chromium. It is used for coating steel, specially for producing stainless steel and for tool steels, also as a catalyst.

Nickel. It is chiefly used to plate on iron and for making tough, strong, non-corrodible alloys *e. g.*, invar, permalloy, cupronickel and nickel silver, in electrical industry for valves.

As nickel strongly resists corrosion, it is much used for armour plating, in the manufacture of guns, aircraft, etc. and as nickel chrome for wire.

Copper. It is chiefly used for electrical conductors, specially in wires and for making brass, bronze and gun metal. With duralumin it is much used in aircraft. It finds other uses in roofing, for utensils, coins, metal works, with beryllium it makes an excellent, tough, springy alloy called b-e.

Platinum. It is a rare costly metal. It finds use in scientific apparatus, chiefly for making laboratory utensils, electric wires and contact points in cars, also in photography, dentistry and as jewellery. It also finds much use as a catalyst in chemistry.

Duralumin. It is an alloy of aluminium, copper, manganese and magnesium. Being extremely light it possesses double the strength of steel; it finds much use in the manufacture of aircraft.

Q. 52. (i) Of what are the following made and to what uses are they put?

- (a) Type metal
- (b) German silver
- (c) Stainless steel

(ii) What are the cigarette boxes of grey silvery metal made of?

(iii) What is the origin of the salts in the sea?

(iv) What is the increase in velocity of a falling body 32 feet per second, per second called?

- (v) Why does a person receive a chill if he sits about in wet clothes even in warm weather ?
- (vi) How does ether produce insensibility to pain when a surgeon sprays it on a part on which he wants to operate ?
- (vii) How does a typical household refrigerator employing liquid ammonia or sulphur dioxide work ?
- (viii) Two long tubes, one with a very fine bore and another with a big one are immersed in water, just upto their lower tips. After some time it is found that water in the tube with the fine bore has forced itself up, while it has not gone up the one with the big bore. What is this due to ?
- (ix) Explain why salt or sugar dissolve in water and not in mercury.
- (x) What is meant by phosphorescence ?
Name animals and substances that possess this property.

Ans. (a) Type metal is an alloy of lead with antimony, tin and sometimes copper. It is extensively used for making various kinds of type, as it takes a fine, clear impression of the mould in which it is hardening. It is also used for metal parts of musical instruments and for ornaments.

(b) German silver is an alloy of copper, zinc and nickel. It is used in table-wares and in heating coils, also in the manufacture of cutlery and ornaments.

(c) Stainless steel is a special alloy of steel that does not rust. It consists of 10 to 20% chromium, .25 to .7% carbon and a small percentage of nickel, the rest being steel.

It finds extensive use in the manufacture of domestic equipment, such as sinks, kitchen accessories and cutlery ; also for making chemical plant and vital parts of machinery which have to resist corrosion and abrasive action.

(ii) Antimony.

(iii) One explanation is that when the earth cooled sufficiently to permit steam to condense and form the first oceans, salty vapours also forming part of the early atmosphere got dissolved in the waters and have remained there ever since.

Another is that the ocean beds contain much rock salt and some other salts, just as we find rocks of solid salt like the Khewra mines in Pakistan and elsewhere and these have dissolved in the waters of the oceans to give them the salty taste. Rivers have also

Lenses are mostly used in devices like the cameras, microscope, search light, spectacles, telescope, stereoscope.

(vi) A diamond is an allotropic crystalline form of pure carbon.

The "fire" in a diamond is due to its property of making total reflection of the light rays that fall on it which practically no other substances possesses. Diamonds have been prepared artificially by throwing pure forms of carbon in boiling oil, which is then suddenly cooled. This immediate contraction of oil leads to immense internal pressure, which converts the carbon into diamonds. But these are only minute particles. Bigger ones have not been produced so far.

(vii) (a) Hydrochloric acid is used extensively in chemical manufactures for pickling and cleaning metal parts, for it dissolves oxides from the surface; also in production of chlorine gas, in tanning, reclaiming rubber, for treating oils or fats, in producing chlorides, glues, dyes, glucose and in medicine.

(b) Nitric acid is used to make explosives, dyes, some organic compounds, and is also employed in steel and copper etching.

(c) Sulphuric acid is used in many branches of the dye industry, in food manufacture, in electrical accumulators, in the manufacture of hydrochloric and nitric acids, for making explosives, drugs and in many metallurgical processes and for petroleum refining.

(d) The Sulphates. The various sulphates are used for various purposes. Thus lead sulphate is used in pigments, potassium sulphate and sulphate of ammonia, in fertilizers and in medicine, sodium sulphate is used to make sulphides and window glass.

(e) The Common salt is used in making glass, pottery, textile dyes, soap, in the preservation of food, for obtaining sodium and chlorine, soda ash, caustic soda, bicarbonate of soda and calcium chloride.

(f) Chlorine is used in water purification as disinfectant, and antiseptic, to make bleaching powder, dyes, fire extinguishers, explosives, in many poison gases, in medicine.

(g) Nitrates are used as fertilizers, for the manufacture of explosives and dye stuffs, in fireworks and in medicine.

(h) Carbon dioxide is used in making aerated water, in fire extinguishers. As dry ice (which is cooled and compressed carbon dioxide in solid form) it finds use in storing ice-cream, shrink-fitting of machine parts, and for chilling a certain type of rubber goods. It is also used as an explosive in coal mining and as a respiratory stimulant when mixed with oxygen.

(i) Coal Tar is the mother of a number of chemical products used for the production of motor spirits for making fast dyes, plastics, synthetic fibres, insecticides, pharmaceutical products, perfumes, sacchrine, for preserving wood, for paints, in making disinfectants and its pitch for road making.

Q. 54. (i) Explain what is meant by the "sign of the zodaic".

(ii). What light has the study of radioactivity thrown upon the question of atomic structure ?

(iii) Explain why an incandescent gas mantle of uranium placed upon a metal tray beneath which is a photographic plate develops the plate.

(iv) What does the term "the midnight sun" mean ?

(v) What do the following terms mean :—

(a) Adaptation (b) Biological control (c) Gamete (d) Gene (e) Moulting (f) Mutation (g) Natural Selection (h) Photo-synthesis (i) Protozoa (j) Sperm (k) Spore (l) Symbiosis (m) Vegetative propagation (n) Virus (o) Zygote.

(vi) What is a cinematograph ? On what is it based.

(vii) Our telephone system can now transmit several hundred conversations at a time ? By what arrangement is this done ?

(viii) How are colours obtained in colour films ?

(ix) How are colours obtained in colour photography ?

(x) What is meant by electronics ? What are the most modern electronic devices in use in our time ?

Ans. (i) The stars have been grouped together in what are called constellations. Twelve of them are distributed around the celestial sphere in such a way that the sun appears to pass through them one after the other during the course of a year. These particular constellations are known as the Signs of the zodaic.

(ii) The study of radio activity by great scientists like Rutherford and Mosely has revealed the structure of the atom. By experiments with alpha particles, emitted by radio-active elements they have shown that every atom consists of a very minute particle, only 10,000th as big across as the atom, which they have termed the *nucleus* and this nucleus is surrounded by a distribution of particles of negative electricity called *electrons*.

All electrons have identical mass and charge : and that the mass of an atom of any kind is several thousand times as great as the mass of the electrons it contains.

(k) **Spore.** This term is applied to a reproductive cell of certain plants like mosses and ferns and to protozoa, i.e., the unicellular animalcules and also to a resistant resting cell stage, with a tough outer wall.

(l) **Symbiosis.** This term means the close association of two living organisms for their mutual benefit.

Examples : The nitrogen fixing, but chlorophyll free bacteria form nodules on the roots of leguminous plants such as alfalfa and those supply the green plants with the nitrogen they want for their growth. The plant in turn containing chlorophyll provides the bacteria with sugar. The termite shelters within its gut a protozoa which in return for the food and lodging it gets enables the termite to digest wood.

(m) **Vegetative propagations.** This term is applied to the reproduction of plants without a sexual process. Thus the sugar-cane is cut at each tier and those are fixed in the ground and they all form the roots of each fresh sugar-cane plant. The runners of straw berries take root at each point along their length. The daffodil bulb gives rise to one or more other bulbs.

(n) **Virus** is such a minute micro-organism that it passes even through the bacterial filter. It can be seen only by an electron microscope. These viruses are the cause of most diseases like poliomyelites, rabies, small pox, chicken pox, yellow fever, mumps, measles etc.

(o) **Zygote.** The fertilized egg, produced by the union of male and female gametes is called a zygote.

(vi) **Cinematograph.** This is another name for the motion pictures, or the cinema, in which the photographs of a series of pictures running in quick succession on a celluloid film are projected on to a screen, and these produce the illusion of our seeing them in continuous motion and not as still pictures which they actually are. This illusion on the eyes is due to the fact, that the impression of the picture which we have just seen for the fraction of a second is retained by the eye till the next picture comes. We cannot thus distinguish between the individual pictures we actually see when we look at a film in the cinema, so that we perceive continuous motion as one projected picture blends into the one coming next.

The movement of the pictures as seen by us thus depends upon the persistence of vision of the successive pictures on our eyes.

(vii) This is done by the co-Axial tube system. "These are two tubes, an outer and an inner one, with a common axis. While a pair of telephone wires can carry only one conversation at a time, a pair of these tubes can transmit several hundred conversations at a time. This is done by connecting many small transmitters and

receivers, each tuned to a special wave-length with the tubes. Many currents on many different wave lengths can travel at a time through the tubes without disturbing each other."

(viii) This is done under two systems, one is called the 'additive' and the other the "subtractive" system. In the first system there are put additional lenses in front of the camera and the projector; in the second, proper colours, are put on the film band itself.

"In the Technicolor Camera the beam of light is split by a half transparent gold prism, and three film band exposed simultaneously; one records the blue elements of the light beam, one the green and one the red. The three negatives are combined by a series of laboratory processes on to a single film containing all the colours ready for projecting on the screen."

(ix) This like the colour film is based on the 'additive' and the "subtractive" systems.

In the additive system "three negatives are exposed through filters in the three primary colours (i.e. the blue, green, red) or a mosaic of tiny filters in these colours are part of the emulsion of a single film or plate. The negative is developed into a positive which can be viewed by holding it against a light or projected on to a screen."

(x) Electronics is the science that deals with the use of electrons emitted from solids or liquids and made to move through a vacuum or gas.

The radio, television, loran, radar devices, electron microscope, betatron, cyclotron, X-ray machine, gramophone and sound-film recording and reproducing apparatus, the electronic "brains" (i.e. the computing and calculating machines), automatic traffic control, electronic heating in medicine and cooking are all electronic devices.

The light of neon signs and mercury vapour, sodium vapour and fluorescent lamps are all produced by the high speed electron through gas.

Q. 55. (a) State in brief how an electric bell works.

(b) State how the electric motor converts electricity into the mechanical energy we want.

(c) If you want to detect the presence of an electric charge what instrument would you use, other than a galvanometer?

(d) What is a Guided Missile? How is it guided? What is fuel for generation of power used in such a missile?

(e) What is gun powder made of? What is its great power of blasting rocks to pieces due to?

The hard compressed air acts like an elastic material inside the rubber tube, for even though the air within the rubber tube is very much compressed, there is still space between its molecules, and it does not act like a solid ring of iron or any other solid, and due to compressibility has much elasticity in it.

(j) The Solar cooker. This is a device for trapping the sun's rays and directing them all to one focus, where the concentrated rays produce sufficient heat to boil water contained in a vessel at the focal point and thus food can be cooked in such a vessel.

In this device a number of curved mirrors one yard each (more or less) are arranged in a bowl and the rays of all are focussed on one point, i.e., where the pot is. All the concentrated rays produce sufficient heat to boil the water in the pot.

On a small scale the National Physical Laboratory at Pusa Road, New Delhi produced a solar cooking stove in which the concentrated rays produced sufficient heat at a high temperature to cook a meal for half a dozen people.

(k) Tar Macadam Roads. These roads are constructed of compacted layers of small broken stones. In this system both the foundation, as well as the top surface is covered with broken stones and an engine with an iron roller wheel in front is constantly made to go backward and forward till the surface gets very hardened and smooth as the stone pieces get crushed. On the topmost layer very small round pieces smeared with tar or bitumen is next laid in a layer about half inch high and this is again crushed by a roller engine. The great pressure of the roller and the cementing force of the tar makes a smooth even surfaced road.

Q. 56. (i) What is an apogee?

(ii) In limestone rocks large quantities of corals and shells are often found. What does this indicate?

(iii) What is a geyser?

(iv) What is a snow-line? What is the height of the snow-line at the equator?

(v) Why is the housefly one of the deadliest enemy of man?

(vi) Which mosquitos spread

(a) Malaria,

(b) Yellow-fever,

(c) Sleeping sickness.

(vii) Which insects are the real friends and benefactors of man?

(viii) What is the function of the white corpuscles in the blood?

(ix) What is sterilization of instrument by surgeons? How is it done?

(x) Sir F. Banting found that if diabetic patients have regular injections of a certain hormone they could live normal lives like other human beings. What is that hormone? How is it administered and where is it got from?

Ans. (i) Apogee. It is the point in the orbit of the moon when it is farthest from the earth.

(ii) This clearly indicates that the limestone rocks have been formed by the consolidation of the marine invertebrate skeletons like those of coral and other invertebrates.

(iii) Geyser. This is a hot spring that intermittently erupts steam and hot water.

(iv) This is the boundary line above which snow always remains on a mountain.

It is at a height of 16000 ft. at the equator.

(v) The housefly is one of the deadliest enemy of man because it is a carrier of deadly germ diseases among which are malaria, typhoid fever, dysentery and diarrhoea. For the fly passes them on from dirt, dung heaps, spitted or vomitted discharge, manure heaps (particularly in our insanitary country districts) on which it settles directly to the food and matter meant for human consumption. All the disease germs in them are carried by them on their legs and wings and thus these flies are a potent factor in the spread of a number of diseases.

(vi) (a) The anopheles mosquito.

(b) The mosquito called stegomyia fasciata.

(c) The tse-tse-fly.

(d) The rat flea.

(vii) The lady bird, the honey bee, silk moth, lac insect.

(viii) White corpuscles are our main and final defence against disease.

"If bacteria enter the body these 'white knights' rush to the attack, throw themselves on enemy bacteria and die in destroying them."

(ix) This is freeing from germs, the instruments a surgeon is to use for operation on a patient, so that the wound during operation does not get septic.

This is done either by keeping the instruments in boiling water which kills all disease germs and washing the hands with soap in tap water, so that the hand does not convey germs to the instruments, or keeping the instruments in a liquid like methylated spirit which kills germs. Instruments drawn out of this liquid are free from germs.

(x) It is the hormone insulin got from the isles of Langerhauns in the pancreas organ of slaughtered sheep or ox.

It is administered subcutaneously by means of a syringe, containing the hormone to the required quantity as prescribed by a doctor. The needle is thrust slantingly into the flesh and the hormone through its nose injected into the flesh. This needle must be thrust into the flesh by a doctor, or by the patient if he has learnt and practiced the method of doing it from a doctor without harm to himself.

Q. 57. (i) With what scientific theory is associated the name of Sigmund Freud ?

(ii) Why and when are ships placed in quarantine ?

(iii) With what discovery is the name of Sir Alexander Fleming associated ? To what use has that discovery been put ?

(iv) With what drug is the name of Dr. S. A. Waksman associated ? To what uses is that drug put ?

(v) State what you know of the earth's shape ?

(vi) What are parasites and saprophytes ? Give examples.

(vii) By what mechanisms are plants able to avoid too great a loss of water in desert regions ?

(viii) Why is dung an important manure ?

(ix) What is meant by artificial manures ? Name some substances that are used as artificial manures and the effects they have on soil.

(x) What animal supply the following clothing material to man ? wool, silk, fur leather.

What animals yield ivory, pearl ?

Ans. (i) Psycho—analysis.

(ii) A ship is placed in quarantine when some infectious disease has broken out in it or it is coming from a country or has touched harbours on its way where infectious diseases, like small pox, diphtheria, bubonic plague or other virulent diseases exist or have broken out.

The ship is kept isolated far out in the sea for a sufficient long time, till doctors of the country where it is harbouring announce that its crew or articles are free from the infectious germs and goods and its crew can be landed on the port.

(iii) He is credited with the discovery of the antibiotic mold, which is identified with the genus *penicillium*, from which the famous drug penicillin has been prepared.

This drug is now applied in the treatment of pneumonia, meningitis, bone infections, tonsillitis, syphilis, gonorrhea, heart diseases of infectious origin, scarlet fever, boils, abscesses, anthrax etc.

(iv) With streptomycin. It is used for treatment of infectious diseases like influenza and pneumonia and most specially for tuberculosis. It also is known to be useful against typhoid, meningitis, whooping cough etc.

(v) The earth is a spheroid i.e. just like a spherical globe, but not exactly a complete sphere.

(vi) These are animals or plants or minute bacteria that live on some other creature or plant which serves to them as their "host", and from which they derive their nourishment, without any efforts of their own. Most are harmful to the host though as in the case called symbiosis they are of mutual benefit.

Among animal parasites are fleas and liverfluke of sheep, the malarial parasite on man, the bubonic plague parasite on man and rat. Plant parasites include the mistletoe, mildews, toadstools and "rust" of wheat etc.

Saprophyte. This is a plant that obtains its nutrition from food that passes directly through its cell membrane and requires no digestive system in the plant. Examples are yeast and mold.

(vii) They are mostly leafless; or the leaves have turned into sharp pricks, so that their sap and water may not be evaporated away through its large green leaves. Example: the cactus. Most plants have stems and leaves that are specially adapted to lessen water loss. They have mostly wide-spread roots which go deep down into the soil and these take up whatever moisture is available. They have also thick woody outer-covering which prevents inner water sap to evaporate. Thus the barrel cactus stores several quarts of fluid in the stem and has a very hard thick outer covering.

(viii) Because animal excreta contains many of the valuable nitrogenous, and potash elements etc. required by good crops.

(ix) Artificial manures are inorganic synthetic or other specially prepared products containing elements required for the growth of the plant life. They include:

1. Phosphates readily obtained from bone as bone meal and from rock salt treated with sulphuric acid or basic slag, got as a refuse from steel furnaces treated with citric acid.

2. Nitrogenous fertilizers such as those derived from nitrate of soda, or sulphate of ammonia.

3. Potash fertilizers e.g., sulphate of potash.

(x) Wool is got mainly from the sheep. Silk from the silk worm reared on mulberry tree.

Fur leather is obtained from a number of wild mammals and animals like the mink, fox, deer, muskrat, rabbit, mole, squirrel, ermine, shunk, beaver, seal, bear etc.

Ivory is yielded by the elephant ; Pearls by oysters, mussels and calms.

Q. 58. (i) Why is an exclusive diet of tinned food harmful ?

(ii) What are the advantages and disadvantages of cooking food ?

(iii) Give an account of the important work in public health carried out by Jenner, Lister and Ross.

(iv) Who was the scientist who gave us the conception of the force that keeps the planets and other heavenly bodies in their eternal places ?

(v) What is the increase in velocity of a body falling 32 feet per second, per second called ?

(vi) When a loaded cart overturns what is it due to ?

(vii) Why will a person experience less tendency to fall when swaying about if his feet are wide apart ?

(viii) It has been observed that at the equator a pound of sugar in a spring balance would weigh a little less than at the poles. Why ?

Why will the same amount of sugar in a common balance weigh the same both at the poles and at the equator ?

(ix) Why are ball bearings used in the moving parts of a bicycle and in the machinery ?

Ans. (i) Because the vitamins found in fresh food get destroyed in course of time if the tinned food has been kept for long. This lack of vitamins is harmful to our health.

(ii) The advantages of cooking food may be enumerated below :—

1. Cooking improves the flavour of food and makes it taste better. Few of us would enjoy raw meat or raw vegetables.

2. When the food has been cooked and seasoned, food becomes very easily digestible, for heat softens the tough fibres of meal and vegetables and breaks the cell walls of the eatable plants.

3. Food softens in the cooking process is easily acted upon by our digestive juices.

4. All the disease carrying bacteria are killed during the process of cooking as the water reaches the boiling point in this process.

Its only disadvantage lies in the fact that some vitamins may be destroyed during the process of cooking. Therefore prolonged or over cooking should be avoided.

(iii) Jenner helped to eradicate the small-pox disease by the vaccination process he introduced. Vaccine therapy has now been widely introduced to fight such other diseases as cholera, plague, typhoid, colitis and tuberculosis.

Thus Jenner's vaccination process has helped us a good deal to fight successfully with many infectious diseases.

Lister's foundation of antiseptic surgery has enormously reduced surgical fatalities, which before him were caused by accidental infection, or by wounds getting septic after operation.

Ross. His researches in the life history of *Plasmodium*, the parasite of malaria, and his furnishing proofs that the infection is transmitted by the bite of the mosquito anopheles, which carries this disease germ in its mouth and saliva, has helped us to hunt out and kill the larva of this mosquito which breeds in ponds, standing water and marshes and thus control this disease and thereby save millions of lives from this dreaded disease.

When and if this mosquito is exterminated malaria in India will be a thing of the past as the bubonic plague is in Europe.

(iv) Issac Newton.

(v) Downward acceleration due to gravity.

(vi) When its centre of gravity falls beyond its wheel base it loses its equilibrium and hence it topples over.

(vii) Because with legs apart the weight of the person gets evenly balanced, than if both his feet were close together, hence he gets into a posture of greater equilibrium.

(iii) The equator is farther away from the centre of gravity than the poles which are nearer to it by about 29 miles than is the equator, hence the spring balance will show greater weight of the body at the poles than at the equator because the gravitational pull on the body will be greater at the poles than at the equator.

In the case of the ordinary balance, the gravitational pull on both the arms of the balance containing the weight balancing the body and the body itself is the same to wherever the balance be taken. Hence both will balance equally at the equator and the poles.

(ix) Because ball bearings by their roundness reduce the frictional surface and therefore the friction itself. Hence the machine due to reduced friction will run faster.

Q. 59. Name the three types of the foods we take that are

1. heat or energy giving ;

2. body building ;

3. that keep the body from falling ill or as they are commonly called protective foods.

Ans. 1. *Foods that gives energy and heat* to the body include all kinds of carbohydrates i.e. organic material produced by plants with the aid of chlorophyll and sunlight. These include starches and sugar. Fat also is an energy giving food.

2. *Body building foods* are rich in proteins. Examples are milk, meat, eggs, liver, cheese, fish, peas, beans, lentils, brown bread, nuts.

2. *Protective foods* are those that include vitamins, butter, green vegetables, fruits and fish.

Q. 60. (a) Why is milk regarded as the most perfect of foods ?

(b) What is fluorescence ? How does it differ from phosphorescence ?

(c) How does the fish breathe while swimming constantly below the surface of water ? Why does it die so soon when out of water ? How is its body adapted to swift and easy swimming ?

(d) How is electricity transmitted over long distances from power stations (thermal or hydro-electric) to industrial centres ?

(e) What is meant by the conception of the 'four dimensional space' ?

(f) What is a fuse ? For what is it employed ?

(g) What is ordinary glass made of and why does it crack at once on sudden heating ? What method can be adopted to decrease this cracking property of glass ?

(h) What is the use of annealing metals and alloys ?

(i) Name :

1. three scavenger birds.

2. three singing birds.

3. three large shady trees.

4. three flowering plants.

5. three birds with brilliant plumage.

6. three game animals.

7. three game birds.

Ans. (a) Because milk contains a balanced mixture in easily digestible form of water, protein, sugar, fat and mineral matter, thus meeting all the needs of the body for its growth and health.

(b) Fluorescence is the property of many minerals to absorb ultra-violet (invisible) light and re-emit the absorbed energy as visible light, usually of a particular colour.

Thus in modern fluorescent lamps, the inside of a glass tube is coated with fluorescent salts. These salts are made to glow by means of ultra violet light produced inside the tube by the mercury vapour in it which has been energized by electricity.

Fluorescence differs from phosphorescence because in the latter some bodies, as for example, the jelly fish, the glow worm or the firefly shine coldly due to the material inside them shining on account of slow oxidation. In fluorescence this light is given from outside as stated above

(c) It is through its gills that the respiration (i. e. the breathing) process in fishes takes place. Through their moist, vascular walls oxygen mixed up in the water of the ocean is absorbed, while carbon dioxide is given off. Thus the breathing process—the taking in of oxygen and giving up of carbon dioxide—continues throughout life, and keeps the fish living.

The fish out of water dies because the gill membrane dries up very soon and this interferes with the process of absorption of oxygen. On the drying up of the gill's membrane the fish feels a sort of choking just as we do if our mouth and nostrils were tightly shut.

The body of a fish is very well adapted to swift and easy swimming, on account of its streamlined shape and its external organs. Thus its head is attached without a neck, its flattened tale serves as a propeller, its fins help in swimming and in directing the course, its loosely jointed backbone facilitates turning, twisting and darting.

(d) This is done by means of the grid system. The power from the power station is transmitted along a net work of thick steel cored aluminium wires, which all along the way are supported on supports called pylons; or the lines may be underground. Transformers of the three phase type (since this type has important technical and economic advantages over single or two phase C.A.C.) are used to step up and step down the voltage of electricity (generally A. C. i. e. alternating current of 50 frequency per second is employed), and switchgears are used to switch the current on to where it is required, and also to control the transformers.

It should be noted that very roughly a voltage of 1000 V is required per mile of transmission distance. Thus for a distance of 100 miles voltages of 100 KV have to be contemplated and this is done by help of the transformers.

[It is also to be noted that power to be transmitted over long distances has to be of high voltage and it is here that transformers come to our help]

(e) The term means the three principal dimensions—length, breadth and height—and time is added to it as the fourth.

[In the space time an event is a point, the history of the event is a line, and the series of events is an area]

(f) A fuse is a short length of wire of low melting point, (e.g. lead or tin). It is used to prevent too high a current flowing through a circuit. If there is flow of a very high current through the circuit, say, when it gets a short circuit, the fuse melts, and thereby brings about a disconnection between the incoming electric current and the wires in the building, thus preventing break out of fire.

(g) Ordinary glass is a mixture of white sand, sodium carbonate and calcium carbonate fused together. Glass readily cracks on heating owing to the strain of uneven heating. This can be minimised by annealing the glass.

(h) Annealing is done to produce a soft ductile material free from internal stresses and hardness.

- (i) 1. The vulture, the kite, the carrion crow.
2. The song-thrush, the skylark, the nightingale.
3. The peepal the *chenar* and the banyan.
4. The hawthorn, the poppy, the rose.
5. The peacock, the male pheasant, the bird of Paradise.
6. The fox, the hare, the deer.
7. The pheasant, the partridge the quail.

Q. 61. (i) We often hear crashes in our radio receiver. What is it due to?

(ii) A saloon constructed in Calcutta during July–August was found to show cracks in most wooden joints when received in Ferozepur in December the same year. What could be the cause of it?

(iii) For a multipurpose project like a hydel project the U.S.A. would use machines for almost everything, while China would rely mostly on man power. Write a short note on it and explain how you would choose between machines and manpower on such a project in India.

(iv) What are the principal factors determining the climate of a place?

(v) What is a bazooka? What is it used for?

(vi) How can you determine the approximate height of a mountain while standing at its base ?

(vii) A thick glass tumbler cracks more easily when boiling water is poured into it than a thin one. Why ?

(viii) Why is a curved track of a train banked on the outside ?

(ix) Before going into an aeroplane we are advised to empty our fountain pen. Why ?

(x) What is blood pressure ? What is it due to ?

Ans. (i) This is due to distant lightning and thunder—storms accompanying them.

(ii) During July-August, the air is warm and moist in Calcutta, hence the wood was subject to the influence of the warm damp air of the city which had the effect of expanding the wood. By December-when the air had got cooled and dried in Ferozepur, the wood had contracted and due to this contraction the wooden joint cracked up.

(iii) In China there is immense idle man power and there is much lack of funds, hence most of the work of excavation and carriage is done through man labour. In the U. S. A., man power is comparatively much dearer, while machinery being readily available for any type of fast work, and fuel power readily available, it pays to the U. S. A. to use machinery to do the same work by skilled labour and thus save time, money and labour than China, where labour is cheap, unemployed and readily available, and China would therefore prefer to employ hand labour than machinery.

In India, we would prefer the middle course. To give employment to labour, as well as to save money for the type of work requiring no skill we would use cheap labour. But if resources are available, and where machinery can do much faster work than labour, we would employ machinery to reach our targets quickly.

(iv) It depends upon many factors such as (1) distance from the equator (2) height of land (3) distance from the sea (4) prevailing winds and ocean currents as the gulf stream has a decisive influence on the climate of north west Europe, specially England (5) the amount of annual cloud, sunshine and rainfall.

(v) A bazooka is a portable rocket, being an open end tube, about 60 inches long. It fires electrically an explosive shell like a bomb. Designed for anti-tank warfare.

(vi) Suppose we stand at a point A at the foot of a mountain and from there go away 200 yards to a place at B. If at B by help of the surveyor's telescope, fitted with a spirit level on a tripod we take the angle of a point C on the summit of the mountain we have the data for measuring the approximate height of the mountain, for

we get a right angled triangle, in which we know the length of base and the angle at the hypotenuse. We can at once calculate the length of the perpendicular showing the height of the mountain.

(vii) In the thick glass tumbler, the sides being thick heat is not conveyed to all parts, inside and out, as rapidly as in a thin glass tumbler. For this reason in the latter case the expansion of glass is nearly even, while it is not so in the case of the thicker one. Hence due to stress and strain created by uneven expansion by heat, the thicker glass tumbler would crack.

(viii) To prevent the train from running tangentially at the curve by the tangential force at the turn of the curve and thus getting derailed. By banking the curve at the outer edge, the train is made to turn on the curved rails and not run forward by the momentum of its motion along the tangential line.

(ix) Because the air high up getting rarefied, the atmospheric pressure outside the enclosed ink tube, which was at ground level when the ink was filled on the ground, would force the ink out of the tube due to its inside having a lower pressure on account of the rarefied air. Also, the rarefied air would not be able to hold back the ink in the tube due to decreased pressure.

(x) By blood pressure is meant the pressure exerted within the walls of the arteries by the force of the heart beat.

This is due either to the decay or thickening of the walls of the arteries in certain diseased conditions, and therefore due to resistance to the normal flow of blood by blood capillaries, and viscosity of blood.

Q. (i) What mechanism do the plants possess by which their seeds are dispersed far and wide to enable their growth and distribution in far off regions?

(ii) What is the distinction between atmosphere, troposphere and stratosphere?

(iii) You wish to keep iced drink cool for a number of hours. Describe some of the ways you can employ to do this if you have no spare ice to keep it cool.

Ans. (i) 1. In some plants the pods explode and shoot their seeds for a distance of a few feet and these are further carried away by air. 2. In others seeds have a hairy covering and these stick to bodies of birds and animals and are thereby carried far off. 3. In many plants as the receptacle which contains the seeds dries and withers, it normally splits and lets the seeds out which are blown away by wind.

(ii) Atmosphere is the gaseous fluid that surrounds our earth. It is said to extend about 600 miles above the earth's surface, but

about 150 miles it is as thin as in all but the best vacuums man can make.

Stratosphere is that part of the atmosphere which extends from 60 miles high to the ionosphere. Troposphere is that part of the atmosphere which extends from 6 to 12 miles high,

(iii) One is to wrap the ice-cold drink in a blanket. As it is a bad conductor of heat or cold, it will prevent the atmospheric heat from penetrating to the ice-cold drink. Another is to use a refrigerator if one has it. It will keep the drink cold. A third method is to use the thermos flask. The thermos flask is an ideal bottle for keeping cold drinks cold, and hot drinks hot.

Q. 63. (i) Explain why it is easier to cut a cardboard with scissors when it is near to the base of the blades instead of near to the points.

(ii) An old clock loses a minute a day. Is the pendulum too short or too long? Give reasons.

(iii) Enumerate the constituents of the air and state in what proportions they are?

(iv) How would you demonstrate the fact that the air possesses about 20% of oxygen?

(v) How is the relative distances of the planets from the sun measured?

(vi) What is meant by the hardening and tempering of steel?

(vii) What sort of vegetation would you find in a high mountain range near the equator, such as the Andes in South America or Kilimanjaro in Africa?

(viii) What is a thunderstorm? How is a thunderstorm caused? Why is it generally accompanied with lightening.

(ix) Why is the climate of Great Britain milder than that of the European continent in its proximity?

Ans. (i) By its very construction the base of the blades of the scissors is nearer to the fulcrum, than the tips of the blades.

Now since the moment of the force is the product of force \times arm; since the arm's length from the fulcrum in the case of the tips is greater than in the case of the base, the moment in both cases being the same, the force working at the base is greater than at the tips. Hence when the scissors is applied to the board, there will be greater force at the base to cut it than at the tips.

(ii) The pendulum is too long; because the longer the pendulum, the longer it will take to make the swings, hence it will

loose time, as a bad pendulum loses time when getting lengthened in summer.

(iii) The atmosphere is composed by weight of :

75.5	%	nitrogen
23.2	%	oxygen
1.8	%	argon
0.05	%	carbon dioxide
0.02	%	krypton
0.005	%	zenon
0.0086	%	neon
0.00050	%	helium

and variable amounts of water, say 0.5%

[Note The student need remember the proportional weights only of nitrogen, oxygen and argon and state that the others i.e. krypton, neon, zenon, helium, carbon dioxide and water vapour are present in minute quantities.]

(vi) If we invert a tumbler of glass over water and then introduce a lighted candle inside it, we will find that when the oxygen in the tumbler has been used up by the candle flame, and only nitrogen is left, water due to atmospheric pressure will rise up in the tumbler to about $\frac{1}{5}$ the length of the tumbler. This clearly demonstrates that atmosphere had about 20% oxygen in it, whose place was taken up by water forcing its way into $\frac{1}{5}$ th of the inside space of the tumbler.

(v) It is measured with accuracy by Kepler's laws of motion so that the measurement of the distance between any two is sufficient to determine the scale of the system and therefore to give the absolute distances of all.

The principle of the method is to observe the position of the nearest planet i. e. Mars relative to the background of the stars at the two places whose distance apart is known. From the relative shift of the position of Mars its distance can be derived.

(vi) If steel is heated to redness and plunged into cold water it becomes as hard and brittle as glass. This process is called hardening of steel.

If it is now heated to various temperatures, the resulting metal possesses properties depending on the temperature. This operation is known as *tempering*.

(vii) It will be nearly the same as in the north temperate zone, consisting mostly of pine, oak, fir etc.

(viii) A thunderstorm is a violent local atmospheric disturbance often accompanied with lightening and great reverberating noise or thunder as that from a great distant explosion.

It is explained as due to violent changes in electrical conditions of the earth and a cloud or two clouds and of the air between them.

"Thus when a thick cloud charged with positive electricity floats near the earth, the negative electricity of the earth pulls upon it. If the tension becomes strong enough the resistance breaks down and rapid electrical oscillations take place between them. This produces lightening. This is why when there are thick clouds clashing to make thunder, lightening often accompanies them.

Now as the heated particles of matter in the air lose their heat, the air rushes back to fill the vacuum, caused first by its expansion due to heat and next contraction due to cooling. This meeting of masses of air and clouds from all sides with great force, produces a sharp clap we call thunder."

(ix) This is due to a number of causes (1) The warm Gulf Stream that visits this island keeps its ports free of ice and also warms the ocean waters round about it. (2) The surrounding Atlantic ocean and rain laden winds from the south west Atlantic ocean, prevent the weather from going to great extremes, the latter of which is a constant feature of land masses of continental Europe far removed from the ocean.

Q. 64. How is sugar manufactured from sugar cane and from beet root ?

Ans. There are five main processes carried on in the manufacture of sugar from sugar cane or beet root.

1. The extraction of the juice. 2. The purification of this juice. 3. The evaporation process in which the juice is concentrated to syrup. 4. The crystallization of the syrup or the boiling of the syrup to grain. 5. The separation of the crystals from the "mother liquor" by the centrifugal process.

We describe each process in bare outline.

1. Juice Extraction. The juice is extracted from the sugar cane by pressure exerted by a series of rolling mills. The rolling mills consist of horizontal cylinders carried in strong frames.

In our country the rollers may be as many as 15 driven by an engine.

The juice is collected in cans and the crushed fibre, called bagasse is again subjected to the action of water and crushed under rollers, so that nearly all juice is extracted from it.

It is said that as much as 97% of the juice is thus extracted.

2. Purification of the juice. The turbid juice so obtained is next heated to the boiling point and lime is added to it, nearly 1

to $1\frac{1}{2}$ lb per ton of the cane. During this process, a large amount of material falls down to the bottom as a precipitate, while the clear juice comes up.

This clear juice is decanted off to evaporating tanks, while the precipitate at the bottom goes to filters, from where the juice is extracted as much as possible and added to the clear juice.

3. The evaporation. In this third process the juice is evaporated till it forms a syrup with a solid content of 60%. In this process the juice in the can is heated both from below and by passing steam round about the tanks or big cans, all of which are arranged in series so that the steam can pass through tubes from one to the other and thus heat the juice in all, simultaneously.

4. Crystallization. The fourth process is to crystallize the thick syrup so obtained.

This is done by boiling the syrup till it forms partly into crystals and partly remains as syrup in vacuum pans.

5. The centrifugal process. The crystals and syrup got from the vacuum pans are then separated in centrifugal machines, which consist of fast rotating perforated vertical cylinders, from which the "mother liquor" passes through the perforations, while the crystals remain behind.

The crystals are dried in the cylinders by superheated steam passing round the cylinders. The mother liquor is again subjected to previous processes, till crystals are formed.

6. The refining process: In this last process charcoal prepared from bones is used to remove colouring. It is mixed with the sugar obtained above, which is liquified and the whole is passed through char filters. The sugar so obtained is white sugar.

In beet root extraction the diffusion process is used. Thus to obtain sugar from beet roots, a diffusion battery consisting of a number of cells is used. At one end of the battery fresh sliced beets are allowed to enter and rich juice is withdrawn at the other end; water is admitted and exhausted beet slices are discharged.

Q. 65. (i) Name the most important organs of the body contained within the abdominal cavity.

(ii) Against each of the following names, write whether it is an animal, a bird, a flower, a tree or a precious stone :

(a) Amethyst

(b) Banyan

(c) Bison

(d) Cashew

(e) Cyprus

(f) Garnet

(g) Geranium

(h) Gold finch

(i) Kiwi

(j) Marigold

(k) Panda

(l) Pheasant

(m) Phlox

(n) Turquoise

(o) Walrus

(iii) Name the instrument used for each of the following purpose :—

- (a) Measuring speed.
- (b) Testing milk
- (c) Continuous recording of the atmospheric pressure.
- (d) Ascertaining the height in an aeroplane.
- (e) Recording the behaviour of the heart.
- (f) Recording earth tremors.
- (g) Knowing approximately the north west direction.
- (h) For seeing a minute object invisible to the naked eye.

Ans: (i) The most important organs within the abdominal cavity are :—

1. The parts of the Alimentary canal from the lower end of the oesophagus to the rectum consisting of the abdomen, the small and large intestines.

2. The liver and gall bladder, the spleen, the urinary bladder, and the internal genital organs of the female.

3. The kidneys and the ureters, the adrenals, the pancreas, the prostate glands in the adults and the great blood vessels and the nerves supplying the abdominal viscera and lower limbs.

- | | | |
|--------------------------|-----|----------------|
| (ii) (a) <i>Amethyst</i> | ... | Precious stone |
| (b) <i>Banyan</i> | ... | Tree |
| (c) <i>Bison</i> | ... | Animal |
| (d) <i>Cashew</i> | ... | Tree |
| (e) <i>Cyprus</i> | ... | Tree |
| (f) <i>Garnet</i> | ... | Precious stone |
| (g) <i>Geranium</i> | ... | Tree |
| (h) <i>Gold Finch</i> | ... | Bird |
| (i) <i>Kiwi</i> | ... | Bird |
| (j) <i>Marigold</i> | ... | Flower |
| (k) <i>Panda</i> | ... | Animal |
| (l) <i>Phcasant</i> | ... | Bird |
| (m) <i>Phlox</i> | ... | Tree |
| (n) <i>Turquoise</i> | ... | Precious stone |
| (o) <i>Walrus</i> | ... | Animal |

- | | |
|------------------------|------------------|
| (iii) (a) Speedometer. | (b) Lactometer. |
| (c) Barograph. | (d) Altimeter. |
| (e) Cardiograph. | (f) Seismograph. |
| (g) Compass. | (h) Microscope. |

Q. 66 (i) The following list contains a number of minerals. Some are elements, some are compounds and some are alloys, Classify them accordingly.

Pewter, Zirconium, Paludrine, stainless steel, Quick-silver, German silver, thallium, alcohol, neon, thorium, morphine.

Elements,

Compounds,

Alloys.

(ii) Name the part or organ of the body when one is suffering from the following diseases :

(1) Dysentery (2) Diabetes (3) Bright's Disease (4) Barber's Itch (5) Pleurisy (6) Typhoid (7) Jaundice (8) Angina Pectoris.

(iii) What is the source of the following :

(1) Morphine (2) Eucalyptus oil (3) Mother of Pearls (4) Indian ink (5) Sperm oil (6) Ivory (7) Copra (8) Artificial silk (9) Glycerine (10) Opium (11) Saccharine (12) Vinegar (13) Linseed oil (14) The linen cloth (15) The *bhang* (16) Musk.

(iv) What is marble made of ?

(v) How is vegetable ghee prepared ?

(vi) How is coal formed in nature ? Name three types of coal.

(vii) What is sublimation ? Give examples of sublimation.

(viii) Describe an experiment to illustrate each of the following :

(a) Change of colour when a chemical reaction takes place.

(b) Evolution of heat when two liquids are mixed.

(c) Formation of a solid when two gases combine.

(ix) What do the following mean :

(a) Mechanical equivalent of heat.

(b) Heat of Neutralization.

(c) Gram molecular volume.

(d) Farad.

(e) Volt.

(f) Watt.

(g) Ampere.

(x) What are the formula of ? :

(1) Glauber's salt,

(2) Corrosive sublimate,

- (3) Epsom salt.
- (4) Rock salt.
- (5) White vitriol.

Ans. (i) *Elements* : Zirconium, Quick-silver (alternate name for mercury), Thallium, Neon, Thorium.

Compounds : Paludrine, Alcohol. Morphine.

Alloys : Pewter, Stainless steel, German silver.

- (ii) (1) *Dysentery* : The bowels.
- (2) *Diabetes* : Pancreas.
- (3) *Bright's disease* : Kidneys.
- (4) *Barber's Itch* : Moustache.
- (5) *Pleurisy* : Lungs.
- (6) *Typhoid* : Intestines.
- (7) *Jaundice* : Liver.
- (8) *Angina Pectoris* : Heart.

(iii) (1) Morphia is derived from opium. (5) Eucalyptus oil is derived from blue gum of the Euclalyptus tree. (3) Oyster. (4) Lamp-black and glue. (5) Whale. (6) Elephant. (7) The coconut tree. (8) Cotton waste, bamboo, bagasse, jute reeds, sun hemp, saw dust, wood pulp etc. (9) Fats and oil of vegetables. (10) The poppy plant. (11) Coal tar. (12) Alcohol. (13) Flax. (14) Hemp. (15) The musk deer.

(iv) Marble is a crystalline rock composed of grains of the mineral calcite i.e. calcium carbonate. It is the result from crystallization of pure limestones under the influence of solutions, increased temperature or increased pressure.

(v) Vegetable ghee is prepared either from coconut oil, palm-kernel oil, cotton seed oil, rape and mustard, linseed or sesamum oils.

These oils cleaned and purified are heated with a little finely divided nickel-powder and hydrogen gas is passed through them. The oils combine with the hydrogen and form odourless and tasteless fats. The nickel is then removed by filtration.

The oil and fat so formed are first churned with slightly soured skimmed milk and this makes a thick emulsion of droplets of skim milk in melted fat. The emulsion is then run on to metal rollers kept freezing cold by cold brine circulating within them. The emulsion sets solid and is worked rolling till it reaches the correct buttery consistency.

This is our vegetable ghee.

(v) Which of the following substances in aqueous (water) solution will turn the blue litmus red?

Ammonia, carbon dioxide, chlorine, common salt, lime, lime juice, soap, sugar, sulphur dioxide, vinegar.

(vi) Why does fanning produce a sense of coolness in the body?

(vii) Is an amphibian a warm or a cold blooded animal? Name atleast three amphibians other than frogs.

Ans. (i) Take a quantity of water in a graduated bottle and weigh it. Next pour exactly equal quantities of both the liquids one after another in this graduated bottle and weigh it each time. The bottle containing water will weigh exactly as in the first tube, while the weight of the bottle containing some other liquid will not be the same.

Next, put both the liquids in two different bottles and drop them both in a freezing mixture. Introduce a thermometer in both of them. It will be seen that at 0°C ice will form on the liquid that contains water and will begin to float on it, while this will not be the case with the other liquid.

(ii) Put a layer of wax on the plate and next scratch your name on it with a needle. Pour hydrofluoric acid over the wax. The plate of the glass exposed by the needle will get etched.

(iv) (1) Kelper discovered the three laws of motion. (2) Mendeleev was the first to arrange the chemical elements in a table in order of atomic mass and to observe the periodicity they displayed so arranged. (3) Bohr's greatest work was in connection with the application of the quantum theory to the structure of the atom. (4) Pascal announced the Pascal Law which states that a fluid in a closed system exerts pressure equally in all directions. (5) Leblanc is famous for introducing the Leblanc process for manufacturing sodium carbonate (washing soda). (6) Sir C. V. Raman is the author of the Raman Effect, which concerns the changes in frequency that occur when monochromatic light is scattered by a transparent medium. (7) Ronald Ross made researches on the life history of the malarial parasite and proved that malaria is caused by the bite of the anopholes mosquito that contains this parasite in its saliva.

(v) Carbon dioxide, soap, sulphur dioxide, vinegar, lime juice.

(vi) Because the continuously fast moving air removes heat from our skin and we thus have a feeling of coolness.

(vii) An amphibian is a cold blooded animal. Examples: toads, salamanders, newts.

Q. 69. (a) If water is poured into a glass tube and mercury into another such one, and their surfaces carefully noted, it is found that water is lifted above the usual level where it comes in contact with the sides of the glass or that the meniscus of water is slightly concave, while the meniscus of mercury is slightly convex. What can this be due to ?

(b) What is monazite ? Where is it found in India ? What is its importance ?

(c) State the important laws of gases.

(d) What is a magneto ? Where is it used ?

(e) Indian standard time is $5\frac{1}{2}$ hours ahead of the Greenwich time. What is the longitude of India ?

(f) Name the following :—

(i) Solid of highest boiling point.

(ii) Solid of highest melting point.

(iii) Liquid of highest density.

(iv) Liquid of greatest specific heat.

(v) Element of lightest atomic weight.

(vi) Element that reaches solidification at the lowest temperature.

(vii) The final product into which uranium disintegrates.

(g) Why does iron float on mercury but not on water ?

(h) Water which at 4°C has completely filled a vessel, begins to overflow as soon as the temperature gets raised or lowered. What is this due to ?

(i) Account for the fact that a piece of cotton catches fire when the sun's rays are focussed on it with a convex glass.

Ans. (a) The phenomenon stated in the question may be explained by the fact that the force of adhesion between glass and water is stronger than the force of cohesion in water itself. Hence the water due to cohesion with glass rises up a little where it comes in contact with glass ; hence as at the point of contact with glass it rises up, the middle portion of the meniscus remains at a lower level. Hence the meniscus is slightly concave. The reverse is the case with mercury, because of the greater force of cohesion in mercury itself. Hence its sides get a bit lowered and it forms a convex meniscus.

(b) Monazite is one of the rare earths, found in the coastal sands of the Kerala State in India. Its importance lies in the fact that it is the chief source of thorium and cerium which like uranium are the source of atomic energy.

(c) The important laws of gases are the following :—

1. Boyle's Law : That at constant temperature, volume of a confined gas decreases in proportion to increase in pressure.

2. Charles' Law : At constant pressure, volume of a gas is directly proportional to temperature.

3. Avogadro's Law : Equal volumes of gases under same pressure and temperature have same number of molecules.

4. Gay Lussac's Law of combining volumes. The law states that volumes of gases that interact to give gaseous product are in ratio of small whole numbers to each other and each has similar relation to volume of product.

(d) A magneto is a small permanent magnetised electric dynamo used to provide high voltages ($8000-12000^{\circ}\text{C}$) to spark plugs to ignite air fuel mixture in an internal combustion engine. Magnetos are used widely in stationery engines, boats, tractors etc. In aircraft engines they are often used in pairs or two separate pairs of spark plugs to make certain of ignition.

(e) For every 15 degrees of longitude, there is a difference of one hour between two places on earth, hence as India is $5\frac{1}{2}$ hours ahead of Greenwich time, through which the zero longitude passes, India is $15 \times 5\frac{1}{2}$ longitudes ahead and to the east of Greenwich.

(f) (i) Solid of highest boiling point=wolfram.

(ii) Solid of highest melting point=carbon.

(iii) Liquid of highest density=Mercury.

(iv) Liquid of greatest specific heat=water.

(v) Element of highest atomic weight=uranium.

(vi) Helium.

(vii) Lead.

(g) Because the specific gravity of mercury is higher than that of iron, while that of iron is greater than that of water.

(h) Because at 4°C water is densest. At temperatures lower than 4°C or higher than 4°C it expands, hence due to this expansion it will overflow the vessel which it fills completely at 4°C .

(i) Because the ignition point of cotton is very low. Therefore the heat rays of the sun concentrated at the focus of the convex lens get easily raised to the ignition temperature on cotton and will burn it.

Q. 70. (a) What sort of forces are acting when ?

(i) You turn a key in the lock.

(ii) You turn a cork screw.

(iii) You open and close a water tap.

(b) Where does the centre of gravity lie of ?

(i) A circular disc.

(ii) A plate of the shape of a parallelogram.

(iii) A triangular plate.

(iv) A cube block.

(v) A sphere.

(vi) A cylinder.

(vii) A pyramid.

(c) Why should a motor bus have a broad base ? How is the road stability of a bus tested ?

(d) What causes the wearing out of the parts of machinery ?

(e) Why has an engine to exert greater force when it is just to start, than when it is actually in motion ?

(f) To what order of lever do the following belong ? :—

(i) A cork pressure.

(ii) A pair of scissors.

(iii) A nail extractor.

(iv) A fire tong.

(v) A sea-saw.

(vi) A wheel barrow.

(vii) Forceps.

Ans. (a) (i) A couple.

(ii) A couple.

(iii) A couple.

(b) (i) In the case of a circular disc it lies at the centre of the disc.

(ii) The centre of gravity of the plate lies at the point of intersection of its two diagonals.

(iii) In a triangular plate the centre of gravity lies at the points of intersection of the medians of the triangle.

(iv) A circular block has its centre of gravity at the point of intersection of its diagonals.

(v) It lies at the centre of the sphere.

(vi) In a cylinder the centre of gravity lies at the middle point of its axis.

(vii) In the case of a pyramid the centre of gravity lies on the line joining the apex to the centre of the base, at a distance equal to $\frac{1}{4}$ th of the length of this line from the base.

(d) It is due to the friction between the parts of machinery.

(e) Because in the beginning it has to exert against the force of inertia, which is far greater than the rolling friction when the train is in motion.

(f) (i) Second order.

(ii) First order.

(iii) First order.

(iv) Third order.

(v) First order.

(vi) Second order.

(vii) Third order.

Q. 71. (i) Why are ball-bearings used in machines ?

(ii) If two pieces of ice are pressed at their flat surfaces, it is found that on releasing the pressure they stick together. Why should this be so ?

(iii) When ice and salt are mixed together, we obtain a freezing mixture of -20°C . Why does this lowering of temperature take place ?

(iv) A body of a certain weight is taken from Delhi to somewhere on the equator and is weighed there. Next, it is taken to the top of a hill nearby and again weighed. It is then taken to the north pole and weighed there. If it could now be taken to the centre of the earth, what will be the relative changes in the weights of the body ?

(v) Newton's third law states that action and reaction are equal and opposite. According to this law, the force with which a horse pulls a carriage is exactly the same as that with which the carriage pulls back the horse. How then does the whole system move forward ?

(vi) Solids and gases dissolved in liquids generally raise the boiling point of a liquid. State whether this statement is correct.

Ans (i) Ball bearings due to their circular motion reduce friction between parts of machinery. It is to be noted that rolling friction is far less than sliding friction. On this account the round ball bearings are used in machinery to substitute rolling friction in place of sliding friction between parts of machinery.

(ii) This happens because at those points where the ice blocks are pressed, the melting point, due to pressure, becomes less than

0°C and therefore some ice melts [This is due to the fact that bodies like ice that contract on pressure being applied to them get their temperature lowered]. Now since the temperature of solid ice is 0°C and this is above the melted ice, therefore on releasing the pressure, the water formed reaches a bit higher temperature i. e. to 0°C at which it again solidifies, and thus the two pieces get joined again. This is the principle of regelation.

(iii) The fall in temperature is due to the fact that when salt dissolves, it absorbs a certain amount of heat, called the heat of solution. This heat is extracted from the ice and therefore, the mixture reaches a temperature lower than 0°C i. e. lower than the temperature of ice.

(iv) If W be the weight of the body at Delhi, the weight will be less at the equator, for at the equator, the distance from the centre of the earth will be greater than at Delhi. At the top of the hill near the equator it will be even still more less, for it is farther away from the centre of the earth than the plain nearby on the equator. When it is taken to the north pole it will weigh more than at Delhi, for the pole is nearer to the centre of the earth than Delhi.

If the body be taken to the centre of the earth, the weight will be zero, because it will be pulled equally in all directions by the force of gravity.

(v) The system moves only due to the external force acting on it. The horse trying to go forward pushes the earth backward with the feet and an equal amount of reaction acts on account of friction. Since the earth cannot be pushed back, the horse is thrust forward. There is also a certain force of friction between the wheels of the carriage and the ground acting in the backward direction. When this is less than the forward force in the horse, the latter system moves forward.

(vi) Solids dissolved in liquids do generally raise the boiling point of a liquid, but gases dissolved in liquids usually lower the boiling point.

Q. 72. (i) How are submarines submerged deep under the sea surface made to rise ?

(ii) What are the following persons famous for ? :

- | | |
|----------------|---------------------|
| (a) Cavendish | (b) Edison |
| (c) Pertz | (d) Torricelli |
| (e) Pasteur | (f) Lord Rutherford |
| (g) Archimedes | (h) Boyle |
| (i) Lavoisier | (j) Jenner |
| (k) Avogadro | |

Ans (i) Water is allowed to flow into the tanks of the submarine. Its weight together with the weight of the submarine, is greater than that of the surrounding water. Hence, it sinks. To raise it very powerful pumps containing compressed air under great pressure are made to work. The high pressure air drives the water in the tanks in the sub-marine into the surrounding water of the sea. The expulsion of water makes the submarine get lighter and it thus rises to the surface of the sea.

(ii) (a) Cavendish is famous for identifying hydrogen as an element; next for determining the major components of atmosphere and for synthesising water.

(b) Edison is famous for numerous inventions best known of which are the incandescent lamp, the phonograph, the motion picture projection and the camera.

(c) Hertz is famous for his discovery of the *Hertzian wave* i. e. short wave length radio waves, which are basic to modern wireless communication.

(d) Toricelli is best known for his construction of the mercury barometer and for the atmospheric pressure measurements he made with it.

(e) Pasteur is famous as the father of modern bacteriology. He discovered and controlled the germ which attacks silkworm, devised methods for growing bacteria and laid the foundation for later work on antiseptic surgery. He devised a method for pasteurization, which destroys harmful organism in milk. He devised a method to immunize sheep against anthrax and an anti-rabies treatment. All this was possible due to his discovery of the harmful effect of the particular type of bacteria in each case.

(f) Lord Rutherford is famous for his experiments on, and exposition of the structure of the atom.

(g) Archimedes is famous as the discoverer of the archimedian principle which states that an immersed body displaces its own weight of the fluid.

(h) Boyle is famous for putting forth the Boyle's Law which states that in a gas at constant temperature the volume is inversely proportional to the pressure.

(i) Lavoisier is one of the founders of modern chemistry. It was he who first announced that the weight of the products of a chemical reaction is equal to the weight of the reagents that took part in it. The conclusion is that matter is neither created, nor destroyed in any chemical reaction.

(j) Jenner is world known for his discovery of vaccination for smallpox.

(k) Avogadro is known for advancing the hypothesis that under the same temperature and pressure equal volumes of different gases contain equal number of molecules.

Q. 73. (i) To what height does the column of water supported by the atmospheric pressure rise in a torricellian tube? To what height does mercury rise in such a tube?

(ii) If you wish to have a continuous record of the variations of atmospheric pressure, which instrument would you use? Describe such an instrument.

(iii) What is the standard atmospheric pressure per square inch?

(iv) What is the science called which deals with? :—

(a) The preservation and promotion of health.

(b) Speech sounds.

(c) Aerial locomotion.

(d) Evolution of the universe.

(e) Man and his works.

(f) Structure of animals and plants.

(g) Structure of the rocks.

(h) The nature and composition of matter and the changes it undergoes.

(i) Matter and energy and the relations between them.

(iv) Who is the scientist who discovered? :—

(a) The three basic law of motion.

(b) Electromagnetic induction.

(c) The laws of universal gravitation.

(d) Oxygen

(e) That combustion is due to the combination of the burning substance with oxygen and not any fiery substance like the supposed phlogiston.

(f) That the pressure exerted by a liquid depends on the height of the liquid and not on the shape of the vessel containing it.

Ans. (i) Water rises to a height of 34 ft. or 10.41 meters. Mercury rises to a height of 76 cm.

(ii) The instrument used for producing a continuous record of the variations of atmospheric pressure is called a barograph.

This instrument like the aneroid barometer has an elongated metallic box, with a thin flexible metallic top. A spring pressing on the lid moves up and down as the pressure of atmosphere decreases or increases. This movement is transferred through levers to a pen or stylus which leaves an ink mark on the revol-

ring paper and thus it produces a continuous record of the variations of atmospheric pressure.

(iii) It is 14.7 lbs. per square inch.

(iv) (a) Hygiene.

(b) Phonetics.

(c) Aeronautics.

(d) Cosmology.

(e) Anthropology.

(f) Morphology.

(g) Geology.

(h) Chemistry.

(i) Physics.

(iv) (a) Kepler.

(b) Michael Faraday.

(c) Sir Issac Newton.

(d) Priestly.

(e) Lavoisier.

(f) Pascal.

Q. 74. (a) Which is the instrument employed for detecting radio activity ?

(b) Which is the apparatus used for proving that at any place in a liquid the pressure acts equally on all directions ?

(c) Which is the instrument used by submarines submerged in water to view objects on the surface of the ocean ?

(d) Which is the instrument used in ships to determine latitude and longitude ?

(e) Which type of engine uses heavy oil ?

(f) Which is the instrument that gives the highest and the lowest temperature reached in a period of time ?

(g) Which is the apparatus used to detect submarines under water ?

(h) Which instrument is employed for listening to sound transmitted through water ?

(i) Which is the instrument that detects small currents of electricity ?

(j) By which instrument is the speed of motor cars measured ?

(k) By using which instrument can you know approximately the north south direction of a place ?

Ans. (a) Geiger counter.

(b) Manometer.

(c) Periscope.

(d) Sextant.

(e) The diesel engine.

(f) Minimum and maximum thermometer.

(g) Hydrophone.

- (h) Hydrophone.
- (i) Galvanometer.
- (j) Speedometer.
- (k) Compass.

Q. 75. (i) What are the following in an aeroplane ?

- (a) The fuselage.
- (b) The ailerons.
- (c) The rudder.

(ii) What is the principle of flight of an aeroplane ?

Ans. (i) (a) The long round body of the aeroplane in which the pilot, the operator and the passengers sit and which also contains the cargo is called the fuselage.

(b) Ailerons are the hinged adjustable back portions of the main plane. They help to tilt the plane around an axis parallel to the body.

(c) The back part of the fin of an aeroplane that helps to move it to the right and left and thus steer it to the direction required is called the rudder.

(ii) The principle on which a plane rises in the air and remains moving in it may be stated thus :—

“Whenever a solid surface moves with sufficient velocity through air, or air moves past the surface, a force acts upon that surface, which may be resolved into a component perpendicular to the surface, called the *pressure* and a second component parallel to it. The pressure may be resolved again into a vertical force called the *lift* and a horizontal force called the *drag* which opposes the forward motion of the solid surface. Now if the lift is greater than the weight of the moving solid body it will rise and float in the air.”

The problem then to be solved is : how to produce this force of lift sufficiently great to make the body rise in the air and keep floating in it.

This is done by means of the curved propeller blades which are made to rotate at very high speed and secondly by giving a paper curvature to the surface of the plane that is to be moved up.

What the high speed rotating curved propeller does is to produce a screw action as it bites through the air. For just as when a screw is rotated it moves forward, so the rotating propeller takes the aeroplane forward and gives it the forward velocity through the air.

Also, as proper curvature is given to the body of the plane, the movement of the air acting on it acts according to the principle of Bernoulli's theorem, which states that in the case of a flowing stream, where velocity is greater, the pressure on the surface

is less, and where velocity is less the pressure is greater. Now since the velocity of the air on the upper curved surface of the aerofoil (i.e., the upper surface of the aeroplane) is greater than on the lower surface, the pressure above the aerofoil is reduced and below it increases. This then is responsible for increasing the lift on the body with the curved surface. Hence the aerofoil gives the greater ratio of lift to drag and, therefore, (to repeat) the upward pressure of the air from below the surface of the plane is sufficiently greater than the downward pressure, the drag and the body's weight and therefore the plane rises up and helps floating so long as the propeller blade keeps rotating at high speed and sends air backwards to flow at high speed over the surface of the aeroplane.

Q. 76. (a) If we pull a heavy box, we feel great difficulty to do so, but if we put small wheels under the same box, we find that the pulling of the box is now very easy. Why should this be so?

(b) Why is lubrication very necessary between different parts of machinery?

Ans. (a) This is due to the fact that sliding friction is far greater than rolling friction. In the first case, the sliding friction comes into play when we pull at the box. In the latter case it is the rolling friction that comes into play when the wheel are put under the box.

(b) Lubrication has the effect of smoothening the roughness of the surface between the different parts. In this way friction is reduced between the moving parts, which would otherwise wear out soon due to continuous friction between them, and secondly the machinery parts do not get heated which they would otherwise do due to constant friction which produces heat and thus might injure the machine. As friction is reduced, the machine also gives a greater output by doing work faster than otherwise.

Q. 77. Write "Yes" or "No" against each of the following :—

(a) The earth is a planet.

(b) The sun goes round the earth.

(c) Tuberculosis affects the lungs of a patient.

(d) Brass is a pure metal.

(e) Air is a compound of nitrogen and oxygen.

(f) Water is a mixture of hydrogen and oxygen,

(g) Hydrogen is an highly inflammable gas.

(h) Chlorine gas kills germs.

(i) Water under pressure boils lower than when there is no pressure on it.

(j) Water boils at a lower temperature in the plains than on the hills.

(k) The sun in the course of a few thousand years will get cooled if it goes on discharging its energy at the rate it is doing now.

(l) Glass is a good conductor of electricity.

(m) Light travels as fast as magnetic radiation,

Ans. (a) Yes.

(h) Yes.

(b) No.

(i) No.

(c) Yes.

(j) No.

(d) No.

(k) No.

(e) No.

(l) No.

(f) No.

(m) Yes.

(g) Yes.

Q. 78 Complete the following statements by adding one or two words at the end of each.

(a) D.D.T. is the most effective.....

(b) Phenyl is a good.....

(c) B.C.G. vaccine is a good preventive against.....

(d) Penicillin is the latest wonder.....

(e) Typhoid is caused by drinking water or milk which is.....

(f) A "balanced" diet for man should contain carbohydrates, fat, mineral salt and.....

(g) Malaria is propagated by.....

(h) Bubonic plague is propagated by.....

(i) Deficiency diseases are caused by the deficiency in food of...

(j) The function of the heart is to maintain blood...

(k) The lungs are the organs of...

(l) A flat plain of alluvial deposit between diverging branches of the mouth of a river is called...

(m) Any departure from the state of normal health either physical or mental and characterized by derangement of functions and by definite symptoms is a...

(n) In geology a fracture or rupture in rock strata along which some movement has taken place, either horizontally or vertically or both is called a...

- | | |
|-------------------------|--|
| Ans. (a) Insecticide. | (h) Rat flees. |
| (b) Disinfectant. | (i) Vitamins. |
| (c) Tuberculosis. | (j) Pressure and circulation of blood. |
| (d) Drug. | (k) Respiration. |
| (e) Contaminated. | (l) Delta. |
| (f) Proteins. | (m) Disease. |
| (g) Anopheles Mosquito. | (n) Fault. |

Q. 79. Write the answer to each of the following question in one or two lines.

- (a) Why do our hands become warm if we rub them together ?
- (b) Why does a candle go out if it is covered with a glass jar?
- (c) Why is an iron rim heated before it is fitted to a wheel?
- (d) What happens when sulphuric acid reacts with zinc ?
- (e) Name the inner core of the atom.
- (f) Of what two particles is the inner core of an atom made?
- (g) By what is the above surrounded?
- (h) What do we call it when a particle splits the inner core of an atom ?
- (i) What is radio-activity ? Who was the first to discover it ?
- (k) Who isolated radium first ?
- (l) What three types of rays are produced by radio-active substances ?
- (m) What diseases are effectively treated by radium?
- (n) Why must a whale unlike a fish come out of water to breathe?

Ans. (a) Friction in the act of rubbing the hands creates heat and hence the hands get warmed up.

(b) Because it soon uses up the oxygen which could keep the candle lighted. The carbon dioxide and nitrogen left in the flask after the oxygen has been used up do not support combustion.

(c) It is so done because iron expands on heating and thus the iron ring slips easily over the wheel. When the iron ring cools, it contracts and in this process it gets firmly fixed on the rim of the wheel on which it has loosely slipped when it had expanded on heating.

(d) With the hot concentrated sulphuric acid zinc gives sulphur dioxide; with somewhat diluted acid, hydrogen sulphide.

(e) Nucleus.

(f) Protons and neutrons.

(g) The electrons.

(h) Nuclear fission.

(i) Radio-activity is spontaneous emission of particles from the atomic nucleus of a chemical element, changing its atomic weight or number and thus yielding a different element. It was discovered by H. Becquerel.

(k) Radium was discovered by Marie and Pierre Curie.

(l) Alpha, Beta, and Gamma rays.

(m) Cancer and certain forms of skin diseases.

(n) Because it can breathe only through its lungs and it must hence come out of water every now and then to take in air.

Q. 80. (i) What is the name given to the positive and negative electrones in the process of electro-analysis ?

(ii) Why is a small quantity of an electrolyte like sulphuric acid added to water in the process of electrolysis ?

(iii) What is the process called in which we get a fine film of a precious metal upon a base material ? This process is widely used for what most purposes ?

(iv) What is an electron microscope ? For what purposes is it used now-a-days ?

(v) In the process of analysis where is the metal to be electroplated put ?

(vi) What is meant by the critical temperature of a gas ? Carbon dioxide is said to have a certain critical temperature. Have oxygen and hydrogen the same critical temperatures ? What are approximately their critical temperatures ?

(vii) It is said that Bombay is more ideally situated for spinning and weaving of cotton than Amritsar, even though the latter is in close proximity to the cotton growing areas of the Punjab. Why should this be so ?

(viii) What is the difference between absolute humidity and relative humidity ?

Ans. (i) The positive terminal is called the anode and the negative the cathode.

(ii) Because absolutely pure water is not a good conductor of electricity. The process of electrolysis will be extremely slow if the electrolyte were not added to it.

(iii) This process is called electroplating. It is widely used to produce anti-corrosive (e.g., nickel or cadmium plating, or for decorative purposes (e.g., gold, silver or platinum plating) and in making electrotype plates etc.

(iv) An electron microscope is a microscope which uses a beam of electrons in place of light.

Since the electron microscope is capable of magnifying an object 10,000 times its size it is used to inspect viruses which can not be seen through an ordinary microscope using light.

(v) It is put at the cathode.

(vi) By critical temperature is meant the temperature at which a gas would be liquified if its temperature is further lowered. But no gas can be liquified at a temperature above its critical temperature. Oxygen and hydrogen have critical temperature of -117° and -238°C respectively.

(vii) It is because the hygroscopic conditions in Bombay are far better than those at Amritsar. Bombay being situated on the sea coast of the Arabian sea, the climatic condition is such that it has a very wet climate which is ideal for cotton spinning and weaving. Amritsar is situated in the dry Punjab, therefore the hygroscopic condition of its climate is not as ideal as that of Bombay.

(viii) Absolute humidity of air is the quantity of water vapour in grams present in one cubic metre of air.

Relative humidity of the atmosphere is the ratio of water pressure of the vapour actually present in the atmosphere to the saturation vapour pressure of water at the same temperature.

Q. 81. What are the following :—

- (a) Dew point.
- (b) Enzymes.
- (c) Hormones.
- (d) Serum.
- (e) Rabies.
- (f) Supersonic speed.
- (g) Protoplasm.
- (h) Cyclotron.
- (i) Chain reaction.
- (j) Spring and neap tides.
- (k) The milky way.
- (l) A multi-purpose project.
- (m) The International Date line.

(n) The Horse Latitude.

(o) The equinoxes.

Ans. (a) The temperature at which the amount of water vapour actually present in the atmosphere becomes enough to saturate it, is called the dew point. It is so called because deposits of dew drops begin to settle down on objects when saturated water vapour cools even by a small amount below this temperature.

(b) Enzymes are organic catalysts secreted by living organisms, by means of which the various chemical changes necessary for life of the cell are controlled. These are usually found in natural secretions such as the digestive secretions, pepsin and trypsin etc.

(c) Hormones are complex organic compounds secreted by glands or certain parts of an organism. They possess, each, certain specific functions. like control of growth or stimulation of certain organs. Thus the hormone insulin is secreted by the pancreas. Other hormones are : adrenalin, thyroxin, pituitary extract etc.

(d) Serum is the watery part of the blood. This term also means a liquid obtained from the blood of some animal made immune to a disease which is used to prevent or cure a particular disease.

(e) Rabies, also called hydrophobia, is a disease caused by infection from animals ; usually by the bite of a mad dog. When far advanced it results in spasm of the throat muscles, choking feeling and delirium, ending in death. Treatment is injection discovered by Pasteur.

(f) Supersonic speed is the speed faster than the speed of sound i.e. above 738 miles per hour.

(g) Protoplasm is the semi-fluid or gelatinous living substance that constitutes the living cells of animals and plants, and comprises carbon, hydrogen, nitrogen, sulphur, phosphorus and sometimes other elements.

(h) Cyclotron is an electrical and magnetic device which accelerates atomic particles to bombard nuclei of atoms.

(i) Chain Reaction is the reaction caused by the bombardment of an atomic nucleus, which releases enough energy to start a series of such reactions.

(j) Spring tides are tides occurring at new moon and full moon. Both the moon and the sun being on the same side, both the lunar and solar tides are heaped on one another. Hence these are the highest tides in a month.

Neap tides are tides that occur when the sun and the moon are 90° apart, so that there is a very small tide.

(k) The milky way, also called the Galaxy is a belt of stars in the heavens, consisting of dense clouds of stars. It is very clearly visible on clear nights.

(l) Multipurpose project. It is a project designed for several simultaneous purposes, as for instance irrigation, the generation of hydroelectric power, flood control, navigation, prevention of soil erosion, fish culture etc.

(m) The International Date Line. This is a modification of the 180th meridian, making the difference in time between East and West. The date is put forward a day when crossing the Line going west and back a day when going east.

(n) The Horse Latitudes. These are belts of calm between regions of the trade wind and westerlies of higher latitudes. The term comes from old times when horses formed part of the cargo of vessels. They were thrown into the sea when the ships remained motionless due to dead calm in the wind and there got scarcity of fodder and water.

(o) The Equinoxes are the two points at which the sun during its apparent annual course among the stars crosses the earth's equator. These occur on March 21 and September 22 of each year and are called respectively the vernal and autumnal equinoxes. The days and nights are equal all over the globe, being 12 hours each.

Q. 82. Answer the following :—

(a) How is the heat value of foods determined ?

(b) How is ice manufactured in ice factories ?

(c) How can tides be made use of to generate large quantities of electric power ?

(d) A man has accidentally swallowed an arsenic preparation. What would you do to save him from the fatal preparation if it has been discovered in time. If the patient has died in which parts or organs of his body would traces of arsenic be found ?

(e) An addict has unconsciously taken a large dose of a vegetable poison like opium or morphine or atropine, nicotine or strychnine. State how you would try to save him by effectively counteracting the harmful effect of the poison while it is still in the stomach and not yet absorbed by the blood.

Ans. (a) "The heat value of different foods is measured by burning a small known mass of the food in oxygen gas and measuring with a calorimeter the total heat produced in the process. This is done in a special type of calorimeter, called the *Bomb Calorimeter*. This consists of a strong steel container, which has an arrangement for introducing oxygen inside it through an inlet and the sample of the food is made to burn in the oxygen filled under a pressure of 20 to 25 atmospheres. Combustion is started by means of an electric current through a platinum coil placed in the powdered sample in a crucible which is suspended in the bomb calorimeter by means of a strong steel wire. On passing the current through the wire the coil of platinum is heated to incandescence and the sample therefore gets ignited. The complete combustion of the sample takes place due to the presence of oxygen. The bomb calorimeter is placed inside a water calorimeter which is further surrounded by a double walled chamber to avoid leakage of heat. The heat given off in the process of burning of the food is measured. This gives us the heat value of the food.

(b) This is done by a process in which liquid ammonia is made to evaporate and cool and in this process of evaporation and cooling to take away heat from water surrounding the vessel in which this is done and thus turning water contained in the vessel into ice as heat is taken away from water.

The whole system is worked as follows :—

Ammonia is made to circulate in a closed coil system by means of a pump. This pump is worked either by an electric motor or an engine.

To start with the description of the apparatus which may be visualized by the reader, there is a coil of a long pipe surrounded by brine and this is enclosed in a closed vessel. This coil (which we may call B) contains liquid ammonia. This ammonia readily evaporates to pass on to a tube which has a valve (we call it V_1). On the downward stroke of the piston this valve V_1 closes and the ammonia vapour coming from the coil B is made to compress in a tube between valve V_1 and another valve V_2 during the stroke of compression. During the upward stroke of the piston the valve V_2 opens and compressed ammonia passes into another coil which we may call A. On this coil A is continuously poured water from a large tap and this cooled coil thus turns the ammonia vapour into the liquid form. This liquid ammonia is made to pass to coil B.

It should now be carefully noted that during the process of evaporation the ammonia in the coil B draws the latent heat from itself and from the brine surrounding the coil B. The brine thus gets cooled fairly below 0°C . The can containing the brine is

surrounding by cans containing fresh water. This fresh water thus gets cooled to 0°C and turns into ice.

Ice so condensed may be removed as soon as it is formed into a solid block and fresh water again poured into the cans. As the process goes on, water goes on turning into the ice we want.

(c) Tides can be made use of for generating large quantities of electric power by taking advantage of their rise and fall. Thus when there is a very high tidal wave during the spring tide passing up a river falling into the sea, a big dam can be built near the place upto which the tide reaches. Into this dam can be poured the water of the tide. At the base of the dam an hydro-electric power station can be built and on its turbines the water can be poured through sluices at the bottom of the dam. As the water continuously pours over the blades of the turbines, these fast revolving turbines can be made to generate electricity. This has actually been done in some countries.

It may be noted that even if there be no river through which the large tidal water may pass up, the tide water may be made to pass through an excavated channel into the dam so built. When the dam has got filled up and the tide has receded, the hydro-electric power station may begin working. The dam and the hydro-electric power station may be surrounded by thick concrete walls that on-coming tide water may not damage or flood them.

(d) The first action should be to induce vomiting by rapid motions of the fingers of the hand on the back part of the tongue. Then wash the stomach by administering warm water and a strong purgative. Next, introduce into the stomach an appropriate antidote, either of a general nature such as an animal charcoal or potassium permanganate or preferably a specific antidote. Give then demulcent drinks e.g. flour and milk, milk and white of egg etc.

The most specific antidote for arsenic poisoning is—dialysed iron or freshly precipitated iron oxide (no alkali should be given).

[Note. For other metallic poisons antidotes are :

for antimony tannic acid (tea)

for mercury whites of two eggs in a pint of skimmed milk

for phosphorus copper sulphate (weak solution)].

In case the man has died, on post-mortem the arsenic would be found in traces in the alimentary canal, in the liver, the gall bladder and kidneys.

(e) Wash out the person's stomach by warm water and administer a strong purgative so that he may have profuse discharges or give him a dilute solution of potassium permanganate.

(candy's crystals)—a large pinch of the crystals to a pint of water. Leave some of the permanganate solution or a suspension of animal charcoal in the stomach, removing and repeating at intervals. Maintain warmth of the patient's body. Give stimulants and apply artificial respiration if found necessary.

Q. 83. Name the instrument and apparatus used for :

- (a) Keeping liquids hot or cold.
- (b) Maintaining a low temperature.
- (c) Maintaining air at an even temperature.
- (d) Listening to the action of the heart and the lungs.
- (e) Converting impulses of sound waves into equivalent electrical impulses.
- (f) Recording the behaviour of the heart i.e. the force, rate etc of the movements of the heart.
- (g) Measuring force and direction of winds.
- (h) To spark plugs to ignite the air fuel mixture in an internal combustion engine.
- (i) Finding the densities of liquids and solutions.
- (j) Comparing the specific gravities of any two liquids.
- (k) Measuring and comparing the viscosities of different liquids.
- (l) Transferring liquids from a higher to a lower level.

Ans. (a) Thermos Flask.

(b) Refrigerator.

(c) Air conditioning apparatus.

(d) Stethoscope.

(e) Microphone.

(f) Cardiograph.

(g) Anemograph.

(h) Magneto.

(i) Hydrometer.

(j) Watts Hydrometer or Hare's apparatus.

(k) Viscometer.

(l) Siphon.

Q. 84. Who is the scientist who ?

(a) Made the first practical demonstration of actual television.

(b) Discovered the treatment of syphilis.

(c) That white light is made up of seven different colours.

(d) Invented vulcanized rubber.

(e) Stated that in the stretching of a spring of wire, the extension is proportional to the applied force.

(f) Discovered the circulation of blood.

(g) Laid the foundations of organic chemistry and synthesised urea.

(h) Invented the first successful engine using heavy oil.

(i) Stated that the sun is the centre of our solar system and that earth and other planets revolve around it.

(j) First stated that the strength of an electric current is equal to the electromotive force divided by the resistance of the conductor.

(k) Measured the velocity of light by a study of the eclipses of Jupiter's satellites.

(l) Discovered the bacterium that causes plague.

(m) Propounded the electro magnetic theory of light.

(n) Manufactured washing soda from the common salt.

(o) Invented the cyclotron.

Ans. (a) J.L. Baird.

(b) Paul Ehrlich.

(c) Sir Issac Newton.

(d) Good Year.

(e) Robert Hooke.

(f) William Harvey.

(g) Leibig Wohler.

(h) Diesel.

(i) Copernicus.

(j) Ohm.

(k) Roemer.

(l) Kataslo.

(m) Maxwell.

(n) Ernest Solvay.

(o) Lawrence.

Q. 85. Name the sciences that deal with :—

(a) Fossil plants.

(b) Mapping of the sky.

(c) The properties of light.

(d) Structures of animals and plants.

(e) The monuments of antiquity.

(f) The heavenly bodies.

(g) Animal life.

- (h) The body tissues.
- (i) The carbon compounds.
- (j) Studies coins and medals.
- (k) Functioning of the human body.
- (l) Mental life.
- (m) Sounds.

- Ans. (a) Palaeobotany. (b) Astrometry.
 (c) Optics. (d) Morphology.
 (e) Archaeology. (f) Astronomy.
 (g) Zoology, (h) Histology,
 (i) Organic Chemistry.
 (j) Numismatics. (k) Human physiology.
 (l) Psychology. (m) Acoustics.

Q. 86. (i) What do you mean by fixing a photographic camera ?

(ii) Where are the highest priced seats placed in a cinema ?
 Why ?

(iii) Where on earth has the body no weight ?

(iv) Why does yeast make the bread rise ?

(v) Why dont you feel pain when you cut your hair or the edges of finger nails ?

(vi) Why are flowers brightly coloured ?

(vii) What is the difference in the colour of the blood of your arteries and veins ?

(viii) What makes you feel the beat of the pulse ?

(ix) What harm will be done to our body if there is a permanent deficiency in our food of ? :—

- (a) Carbohydrates, (b) fats, (c) proteins, (d) vitamins,
 (e) mineral oils.

Ans. (i) By the term 'fixing a photographic camera' is meant the rendering that portion of the sensitive plate which has not been affected by light, insensitive to exposure, after developing it by the action of the 'hypo' i.e. sodium bisulphate.

(ii) Because the nearer the seat is to the cinema screen, the more are the pictures blurred. Hence the highest priced seats are placed at the farthest end of the cinema hall.

(iii) A material body has no weight at the centre of the earth where the gravitational pull on it is equally strong on all sides.

(iv) This is due to minute fungi which convert the sugar of carbohydrates first into glucose and then into alcohol and carbon dioxide. The rising of the bread is specially due to the formation of carbon dioxide gas which goes on slowly escaping into the air and cause the bread to rise.

(v) Because these do not contain nerve cells which cause sensation of pain in other parts of the body.

(vi) This is meant to attract bees, which are attracted by the flower's brilliant colour and begin to hover round it in search of the honey it contains. In this act they sit on the pollen of flowers which gets stuck to their legs and this pollen is deposited on the pistil of another flower. This enters the ovary which is a female organ. Thus it receives the pollen, the male reproductive dust. In this manner the female organ gets fertilized and produces the seeds for the further propagation of the plant.

(vii) The colour of the blood in the arteries surcharged with oxygen is scarlet bright. The colour of blood in the veins which has lost its oxygen and contains waste matter from the tissues is purplish.

(viii) The systole and diastole of the heart pushes the blood in regular rhythms through the arteries, hence the regular beat of the pulse.

(ix) (a) Carbohydrates are our fuel foods, that is to say, they are "burnt" by the body for the purposes of giving us heat and energy. Their deficiency in our food means that we miss the ingredients which give our body heat and energy.

(b) Fats like carbohydrates are burnt in the body to carbon dioxide and water. In this process they give out much more energy than even the carbohydrates and they are therefore a very concentrated form of energy food. Their deficiency in our diet therefore means that we have no ingredient in it to give us extra energy to carry on hard manual labour.

(c) The proteins are our body builders. They replace the tissues that have got worn out. Without them there will be stoppage of growth and general deterioration in health.

(d) Deficiency of vitamins in the food generally reveals itself by some form of disorders. Thus there will be stunted growth if there is deficiency of vitamin A. We may suffer from beri-beri or pellagra if there is deficiency of vitamin B; we may suffer from scurvy if there is no element of vitamin C in our food, and we may suffer from rickets for want of vitamin D etc. etc.

(e) Mineral salts are essential to our blood (for example iron salts), and also for the proper functioning of the glands; e.g., Iodine salts are essential for the formation of bones and teeth.

Thus permanent deficiency of any one of the above mentioned ingredients in our food will make us suffer one way or the other.

Q. 87. (a) If there were no bees on this earth, what will happens to plant life ?

(b, What do you understand by the term metabolism ?

(c) How can be ascertained the height of a house by dropping a stone from its top ? (without a string attached to it).

(d) What is the function in the human body of? 1. liver

2. spleen 3. pinna of the ear 4. kidneys 5. the bladder
6. lungs 7. the skin

(e) Which is heavier volume for volume ?

Iron or mercury.

A Pound avoirdupois or a kilogramme.

A cubic foot of water or a cubic foot of ice.

Platinum or lead.

(f) If you want to protect iron from rusting what will you do ?

(g) What does the circulatory system consist of in human beings? How does blood circulate through this system ?

(h) How is the earth illuminated on days when direct sunlight is shut off by clouds ?

(i) For what human ailments are the following antidotes employed?

1. Salvarsan

6. Insulin

2. Peruvian bark

7. Morphia

3. Sulpha drugs

8. Calf Lymph

4. Ultra violet rays

9. Paludrine

5. The Leech

Ans. (a) There will be no carrying away of pollen to the stigmas of flowers for fertilization and therefore much of plant life will die off.

[It is only the bees that carry off on their wings and feet the plant's male reproductive organ, pollen, to the stigma of the female as they hover from flower to flower in search of honey and deposit this pollen on the stigma from which it reaches the ovary—the female reproductive organ].

(b) By metabolism is meant the physical and chemical activities of living matter. This activity consists of two parts.

1. **Anabolism**, the growth and repair of tissues.

2. **Catabolism**, the release of energy as heat, work, electricity etc.

(c) This can be calculated from $S = \frac{1}{2} ft^2$ where S is the distance of fall, f the acceleration due to gravity, and t the time of the stone from rest.

If by help of a stop watch, time of release of the stone is noted and the time at which the sound of striking of the stone on the ground is heard, we then know the time taken in the fall of the Body. The acceleration due to gravity is 32 feet per second, per second. Hence S can be easily calculated.

(d) 1. **Liver** stores and releases sugar to the blood, manufactures bile, prepares fats and proteins for oxidation, destroys worn out red blood cells, manufactures red blood cells in the young child, produces lymph and a protein essential for blood clotting. It also stores vitamins A and D.

2. **Spleen** is mainly a reservoir supplying the digestive system and muscles with blood during increased activity and helping in the destruction of worn out red blood corpuscles and in the production of lymphocytes.

3. **Pinna** of the ear serves to collect and reflect sound waves to the canal leading to the tympanic membrane of the ear.

4. The **Kidneys** are our most important excretory organs ridding the body of atleast $\frac{3}{4}$ th of its wastes. The kidneys also regulate the concentration of sugar, salt, acid and alkalies of the blood and keep its volume constant.

5. **Bladder** is the storage bag for the waste products in the form of urine discharged by the kidneys, until, when full, it expels out the urine, by making us force it out.

6. **Lungs** are our great organs of respiration. They exchange oxygen for carbon dioxide in the blood. This oxygen is essential to the maintenance of life.

7. **Skin** protects the internal organs of the body, regulates heat, excretes the waste products of the body by means of sweat and serves as the organ of sensation.

(e) Mercury is heavier than iron; an iron piece will float on mercury; a kilogram is heavier than a pound avoirdupois, a cubic foot of water is heavier than a cubic foot of ice, lead is heavier than platinum.

(f) In order to protect iron from rusting it may be painted or heated in steam. The latter operation results in the formation of a

protective film of magnetic oxide of iron over the surface of the metal which makes it rust-proof. The best method now-a-days employed is to galvanize the iron by a coating of molten zinc. This method includes dipping, electroplating and baking.

(g) By the circulatory system is meant the whole system concerned with the circulation of blood through the human body.

It consists of (1) the heart, which is the pumping organ, for receiving impure blood that has come back after circulation throughout the body ; (2) the lungs in which exchange of carbon dioxide and other waste products of breathing takes place ; (3) the veins from the lungs, with the fresh oxygen of the air in the blood in the process of breathing while they bring waste products from rest of the body, (4) the arteries that carry oxygenated blood, which is also full of nourishment to the various parts of the body tissue, (5) the thin walled capillaries through which the nourishment is poured into the tissues and used up waste is carried off. These capillaries connect arterial and venous system in circulation of the blood.

Circulation of the blood takes places in the following manner :—

Oxygenated blood is forced into the general system by its circulation from the left ventricle of the heart through arteries into the network of capillaries through whose thin walls oxygen and nutriment pass into the body tissues, and carbon dioxide and other wastes enter the blood. The deoxygenated blood returns through veins to the right ventricle of the heart and it passes from the right ventricle into pulmonary circulation. After interchange of carbon dioxide and oxygen into the lungs, oxygenated blood passes through pulmonary veins and from the left auricle into the left-ventricle where the cycle beings anew.

(h) The day light we have on cloudy days is diffused light. It is produced by the scattering effect of clouds on sunlight.

(i) 1. Salvasan is employed for the treatment of syphilis.

2. Peruvian bark for malaria.

3. Sulpha-drugs are used in the prevention and treatment of childbirth fevers, bacterial diseases like pneumonia, gonorrhea, erysipelas, meningitis, blood poisoning, septic sore throat, endocarditis and kidney infections.

4. Ultra-violet rays are employed to cure rickets and other deficiency diseases.

5. The leech is sometimes used for blood letting at a diseased part of the body.

6. Insulin for the treatment of diabetes.

7. Morphia is used to alleviate pain.

8. Calf lymph is used for vaccination to prevent small-pox.
9. Paludrine for malaria.

Q. 88. (i) What is the importance of milk, curd, butter in the food of a pure vegetarian ?

(ii) Why is water an essential constituent of our food ?

(iii) Why should hand ground rice be eaten in preference to milled rice ?

(iv) Why is it harmful to throw away the water in which rice or cereals or vegetables are cooked ?

(v) Why is it harmful to eat too many sweet-meats ?

(vi) What is the importance in industry of :

(a) Sulphuric acid, (b) Caustic soda, (c) Soda ash, (d) Turpentine, (e) Woodpulp ?

(vii) What is the difference between the burning of spirit in the oxygen of the air and the burning of food in human beings ?

(viii) What is the use of oxygen to plant and human life ?

(ix) How is the function of breathing carried on in human beings ? Why is it better to breathe through the nose than through the mouth ?

(x) What are the general effect of heat on bodies ?

(xi) Why is a convex mirror mounted on a motor car in front of the driver ?

(xii) What are echoes ? Under what conditions are they distinct ?

Ans. (i) They supply him with vitamins, A, C and D. They also supply him first class protein and incidentally calcium. They are also his best energy giving foods.

(ii) Water is necessary for flushing the body. It also helps in the digestion of food and the proper distribution of its ingredients and in preventing the over-concentration of any ingredient in the body. It thus helps in the proper balancing of energy in the body.

(iii) Grounded rice contains the important vitamin B, because it is contained in the husk of the rice, but not in its starchy portion. So if polished rice without the husk is eaten there is likelihood of the disease beri-beri occurring, specially if milk and fresh vegetables are not taken and one subsists mainly on the polished-milled rice. The beri-beri is a nerve-disease and is sure to bring about weakness and tenderness in most parts of the body.

(iv) Because the water contains vitamins in the solution extracted from the rice, pulses and vegetables and its throwing away means that we are deprived of vitamins so necessary to our health.

(v) Too much sweetmeat taking means digesting excessive quantities of sugar, all of which the insulin excreted by the pancreas cannot turn into the useful glucose. Excessive sugar contents in the blood means boils, indigestion and many ailments, such as those from which diabetic patients suffer. These sweetmeats are also devoid of vitamins so they are not necessary to health.

(vi) (a) Sulphuric acid is used in the manufacture of hydrochloric acid, nitric acid, explosives, coal tar derivatives, or the dye industry, in electrical accumulators, in making drugs, fertilizers, petroleum refining and in metallurgical processes.

(b) Caustic soda is used in industry as a source of metallic sodium, for the manufacture of soap and artificial silk and in the dye industry.

(c) Soda ash (sodium carbonate) is used in the manufacture of glass, caustic soda and soap.

(d) Turpentine is used as a solvent, and as a drying agent in the manufacture of paints and varnishes.

(e) Woodpulp is used in the manufacture of paper, as also for the preparation of artificial silk when prepared from spruce.

(vii) Both the processes are almost identical, in that there is production of energy and the giving off of carbon dioxide and water. The difference between the two is that it is quicker and more intense in the case of the spirit than that of the human body.

(viii) Both human beings and plants require a continuous supply of oxygen for growth and energy. Both will not survive for long if deprived of oxygen though in the case of human beings the process of decay starts within a very short time of the stoppage of the supply of oxygen to it.

(ix) The function of breathing is in the following manner :—

We breathe by the expansion and contraction of lungs which is a continuous process. The manner of their expansion and contraction is as follows :

The lungs are completely enclosed in a case with a movable wall.

The top of this case is the row of ribs and the bottom is the diaphragm which is a big sheet of muscles dividing the body in two.

The lungs in the case fill it completely. Now this case can expand and contract. When it expands, the lungs must expand too and in this process they draw in the air; if they did not, a vacuum would be left between them and the lining of the case and the pressure of outside air forcing itself in would at once expand them. So during the process of expansion air has to be taken in. In this expansion of the chest wall, the diaphragm contracts and this pulls down the wall of the chest which makes the lungs to contract and expel out the air in them. Again, the vacuum is created in the lungs and outside air forces itself in. So the continuous process of breathing in and out of the atmospheric air due to expansion and contraction of the chest and simultaneously of the lungs goes on till life.

It is better to breathe through the nose than through the mouth, because in the first instance while passing through the long passage of the nose, the hair in the nose act as a sieve keeping impurities like dust particles outside and secondly during the chilly winter, cold air passes through a comparatively long passage and gets a bit warmer and does not affect the lungs as quickly as it will do if it is gulped through the mouth. Thirdly, what is most important is that there is deeper breathing through the nose than through the mouth, so that by breathing more deeply we can increase our air supply when the body requires more oxygen and we thus supply more oxygen to the depths of the lung cells and thereby make the lungs stronger, as well as the blood richer in oxygen.

(x) When bodies are heated marked physical changes are observed to take place in them. One of these is the state of change on account of which a solid body is converted into a liquid when sufficiently heated and a liquid when heated further is converted into a gas.

Among other changes are expansion and contraction, (ice contracts when heated) chemical changes and electrical changes.

(xi) This is to give a magnified reflection of objects coming from behind and thus help the driver to be aware of the traffic behind him and guard him against accidents.

(xii) An echo is the effect produced when sound is reflected or thrown back on meeting a large solid obstacle such as the side of a hill or a large building.

For the echo of a sharp sound to be heard distinctly and separately from the sound itself, the echo should fall on the ear about $\frac{1}{10}$ th of a second after the original sharp sound. This is because the mental impression of a sound persists in the brain for about $\frac{1}{10}$ th of a second after the sound waves fall on the ear. If therefore the reflection of the same sound falls within $\frac{1}{10}$ th second, the brain will not analyse it as a separate sound.

The velocity of sound in air is 1090 ft. per second at 0°C and increases at the rate of 2 ft. per second for 1°C rise of temperature. Suppose the temperature of the air is 15°C , then the velocity of sound in it is 1120 ft. per second. The distance travelled by sound in $\frac{1}{10}$ th second is thus 112 ft. Therefore the distance between the listener and the reflecting surface must be at least 56 ft. for the sharp sound and its echo to be heard distinctly.

Q. 93. (i) How are fins useful to fish ?

(ii) Which are the chief sources from which plants derive their food ?

(iii) Mention some diseases caused by insects ?

(iv) Electric refrigerators have to be defrosted of the ice that accumulates on the coils inside the box. Where does this ice come from ?

(v) Of what importance is relative humidity to health ?

(vi) Why does snow which has black dirt or soot on it melt more rapidly than clean snow ? Why does ice melt when salt is scattered on it ?

(vii) What are the following composed or made of ? (a) chalk (b) a photographic camera (c) the human eye (d) the human ear (e) the nervous system in man.

(viii) What is to us the advantage of having two eyes instead of one ?

(ix) Why does a bad egg float in water ?

(x) When the running train is bulging smoke, does the smoke go forward or backward.

(xi) How would you find out the time at a place when Greenwich time and longitude are given ?

(xii) How would you find out the four directions from a place where you are standing on a dark starry night ?

(xiii) Why does a straight stick look bent while partly immersed in water.

Ans. (i) The fins are the principal organs of locomotion and aid in maintaining equilibrium.

To one kind of fish, the flying fish, the fins are used as planes for gliding in the air.

(ii) The chief source of plant food are :—

1. The air from which they get carbon dioxide, which is absorbed by the leaves and this is then converted

internally into organic foods by the process of photosynthesis.

2. Nitrogenous and other mineral compounds are got through the roots from the soil.

(iii) Some of the diseases caused by insects are :—

(a) Kalaazar is caused by the bite of sand fly.

(b) Malaria is caused by the bite of the anopholes mosquito.

(c) Plague is caused by the bite of the rat flea which has the plague germs.

(d) The tsetse fly transmits the disease mamba to cattle and sleeping sickness to man.

(iv) It is the water vapour in the air that solidifies and forms ice flakes on the wires inside the refrigerator due to the cooling process in the refrigerator.

(v) Relative humidity is important to our health and comfort. When the relative humidity indoors is very low the moisture on the skin and on the lining of the nose and throat tends to evaporate very rapidly. This condition is not healthful, for soon we feel having a parched throat, nose and skin and constant thirst for water and an inclination to bathe. Buildings in which the relative humidity is kept between 50 and 65 per cent and a temperature of 68° F are as comfortable as the one at 72° F with a relative humidity of 35 per cent.

Similarly when the relative humidity is very high as on a hot, damp or a cloudy day, we perspire very freely and this perspiration does not evaporate. We then feel very uncomfortable.

So relative humidity of the air should neither be very low, nor very high.

(vi) This is due to the fact that soot or dirt or salt make a soluble mixture with ice, absorbing in this process a fair amount of heat, called the heat of solution. This heat is thus extracted from the ice and the mixture, the temperature of which falls below zero point and makes a freezing mixture—i.e. a liquid with a temperature considerably below 0°C.

(vii) (a) Chalk consists of calcium carbonate CaCO_3 .

(b) A photographic camera is primarily a lighttight box with a convex lens in the centre of the wall through which the image is to be taken. Its length can be varied. It has also a shutter which is an arrangement for covering and uncovering the lens for short whiles. The lens throws a sharp image of the object to be photographed on to a sensitive plate or film which receives a permanent image capable of being made visible.

(c) The human eye is a roughly spherical structure contained in the body socket of the face. The globe contains three parts directly concerned with vision. These are three different coverings—the outer or protective covering, the sclerotic or tough fibre and the centre called the iris.

There is also an inside nervous screen called the retina. The globe is filled with fluid matter which keeps it firm. In the middle of the iris is a hole and it is through this aperture that light enters as in a camera.

Just behind the iris is a lens where the light is focussed and strikes on the delicate inner membrane, the retina: thence the impulse is transmitted to the brain by the optic nerve.

(d) The ear consists of three parts; the inner ear; the middle ear and the outer ear. The inner ear contains a small coiled tube called the cochlea which is hedged in the skull. It is filled with fluid. This inner part of the ear is separated from the middle ear by a membrane called the drum and this in turn is separated by a membrane, called the tympanic membrane from the tube of the external ear which gathers the sound from outside. The space between these membranes is filled with air. This space also has three small bones called the auditory ossicles and they stretch from the tympanic to the inner ear.

It is these bones that transfer outer vibrations to the inner ear and start motion in the fluid of the inner ear, which is carried by auditory nerves to the brain.

(e) The nervous system consists of (1) the various nerves (made of cells, fibres, and organs, connecting tissues etc) which convey sensations from the various parts of the body to the brain and responsive impulses from the brain and the spinal cord back to the rest of the body; (2) a second system which is not under voluntary control centring on ganglia adjoining the spinal cord. This system controls the life processes, such as digestion, respiration, blood circulation etc. etc.

(viii) It is for nothing that nature has given us two eyes. Both our eyes receive nearly, but not quite, the same impression and from the slight difference between the two views we get our idea of distance and "solidity". One eyed people cannot judge distances as exactly as two eyed. Thus a one-eyed person often pours the tea behind or in front of the cup. Sight with two eyes gives a solid effect. The right eye sees a little more of the right side of an object and the left eye sees a little more of the left side.

Also, if by any chance one eye is lost, the second is there to help the man through life. If there was only one, the man would become totally blind if it were permanently injured.

(ix) Owing to fermentation in the yoke and the putrid gas in it, it becomes, volume for volume, lighter than water and hence it floats on water.

(x) The smoke is going forward in the direction of the train, but so much slowly that it seems to be going backward. This is due to the resistance of the air, which resists the progress both of the train and of the smoke, but its resistance to the smoke is far more than to the train. If the train were running in a vacuum, both the smoke and the train would be running together.

(xi) The earth passes through 360° of longitude in 24 hours; thus 15° of longitude represent one hour of difference, in apparent time. Therefore if Greenwich time is taken as the standard time, and we know the longitude of a place we can at once calculate the time at any place by taking into consideration the fact that 15° of longitude represents a difference of one hour.

If a place is 15° longitude east of Greenwich, its time is one hour earlier to the Greenwich time, and if 15° longitude in the west it is late by one hour and so on.

(xii) This can easily be found by looking forward to the Pole Star which is the brightest of the Ursa Minor (or Little Bear) constellation of stars.

Now the Pole Star is the nearest conspicuous body to the North pole of the heavens and is only about 1° distant from it. Therefore, when we have located the Pole Star and are facing towards it, our back is turned towards the south, our outstretched right arm will point towards the east and the left towards the west.

(xiii) This is due to refraction of light. The rays coming from the points of the stick which is below the water are bent away from the normal as they leave the water which is a denser medium and enter the air which is a lighter medium and therefore the image of these points formed by producing the rays backward and nearer to the surface will appear to have got raised and due to this, the immersed part will appear to have got bent.

Q. 94. (A) Name the following :—

- (i) The four Elements
- (ii) The sense organs
- (iii) The vital organs
- (iv) The Planets

(v) The colours into which a ray of light is split when passed through a prism

(vi) Essential requirements of health.

(vii) Serious infectious diseases of India

(viii) The nerve conveying outside impressions of light, colour, images etc. to the brain.

(ix) The phenomenon occurring when either the earth or the moon moves into the shadow cast into space by the other.

(B) Name the instruments used for the following purposes :—

(i) Observing distant objects

(ii) Observing minute objects

(iii) For testing milk

(iv) Measuring atmospheric pressure

(v) Measuring rainfall

(vi) Recording the shock of an earthquake

(vii) Finding direction at sea

(viii) Detecting the approach of an aeroplane

(ix) Detecting the presence of electricity

(x) Projecting moving pictures

(xi) Demonstrating the rotation of the earth

(xii) Helping breathing in infantile paralysis

Ans. A. (i) According to Aristotle all substances were to be regarded as composed of four simple bodies. These bodies or elements were :—

fire, air, water and earth.

(ii) The sense organs may be classified under the following headings ,

1. Those which receive the perception of touch

2. " " " " " " taste

3. " " " " " " smell

4. " " " " " " sound

5. " " " " " " light

(1) The sense of light is provided by the eye, (2) that of sound by the ear, (3) smell by the nerve ending in the nose,

(4) taste by taste buds of tongue and (5) of touch by a number of nerve endings or nerve tissues in the skin. Thus the sense of pain is perceived by nerve fibres in the deeper layer of the skin, of light touch by Meissners' corpuscles in the skin, heat and cold by nerves ending in the skin, pressure by pacenian corpuscles in the skin.

(iii) The following are the most important vital organs in the body.

(1) The heart (2) The lungs (3) The liver (4) The kidneys (5) The brain along with the spinal cord i.e. the central nervous system (6) The various glands producing hormones for the vital processes in the body.

(iv) Mercury, Venus, the Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto.

(v) Violet, indigo, blue, green, yellow, orange, red.

(vi) In the individual health depends on cleanliness of the body and surroundings, exercise, a balanced diet and suitable occupation, proper leisure and freedom from worries and harassments etc.

(vii) Some of the serious infectious diseases of India are the following :—

Typhoid, tuberculosis, malaria (by the mosquito), gonorrhoea, lockjaw, small-pox, chickenpox, measles, mumps, influenza, colds, diphtheria, whooping cough and typhus.

(viii) Optic nerve.

(ix) Eclipse.

B. (i) The telescope (ii) The microscope (iii) Hydrometer (iv) The Aneroid barometer (v) Rain gauge (vi) Seismograph (vii) The mariner's compass (viii) Radar (ix) Electroscope (x) Kinematograph (xi) Stethoscope (xii) Iron lungs.

Q. 95. Who discovered or invented the following :

(i) The science of Geometry

(ii) That bodies fall because of the force of gravity

(iii) The telescope

(iv) That atoms are made up of electrons

(v) The lighting conductor.

(vi) The art of printing

(vii) Miner's safety lamp

(viii) The Telegraphic Code of dots and dashes

(ix) The telephone

(x) Books for the blind

(xi) Shorthand system of writing

(xii) Vaccination

(xiii) Motion Picture

(xiv) That plants are sensitive to shocks

(xv) Penicillin

Ans. (i) Euclid (ii) Newton (iii) Galileo (iv) Ernest Rutherford (v) Benjamin Franklin (vi) Gutenberg (vii) Sir Humphry Davy (viii) S. F. B. Morse (ix) Alexander Graham Bell (x) Louis Braille (xi) Sir Issac Pitman (xii) Edward Jenner (xiii) Edison (xiv) Sir Jagdish Chander Bose (xv) Sir Alexander Fleming.

Q. 96. (i) Suppose you had to fire a long range gun at an object 100 miles due north of you, would you aim directly at the target or to the right or to the left of it?

(ii) Name the diseases and the purposes, *i.e.*, curative or protective, for which the following treatment is administered :

(a) Deep X-ray therapy.

(b) B. C. G. Vaccination.

(c) Paludrine.

(d) Penicillin injections.

(e) Sulphetrone.

(f) Insulin injections.

(iii) What do you understand by ? :—

(a) Infra red rays.

(b) Ultra violet rays.

(c) Atom Bomb.

(d) Television.

(e) Dynamite.

(f) Typhoon.

(iv) Answer the following :

(a) Why does a person run before taking a leap ?

(b) A tumbler, full of water, and covered with a piece of paper placed over the top can be inverted without spilling the water. How and Why ?

(c) Why is a clinical thermometer used in preference to an ordinary Fahrenheit thermometer ? Why is the former graduated from 95° F to 110° F ?

(d) A wire carrying heavy weights at its ends cuts its way through a block of ice, whereas the block remains uncut. Why ?

(e) Water may be boiled in a paper box without burning the paper. How ?

(f) Why is phosphorus kept under water and metallic sodium under kerosine oil ?

- (g) How does washing soda differ from caustic soda ? Why is not the latter used for washing clothes ?
- (h) What is fuse wire ? Why and where is it used ?
- (i) How does black lead differ from red lead ?
- (v) Answer the following :
- (a) What objects fall fastest (i) in air (ii) in a vacuum ?
- (b) In what units are (i) Mass (ii) Length (iii) Time expressed in scientific work ?
- (c) What are solids : liquids and gases ?
- (d) Explain why ice can be preserved by wrapping it in a blanket ?
- (e) What are the chief characteristics of acids ?
- (f) What foods would a man prefer in a cold climate ?
- (g) Explain in one sentence the difference between the roles of nitrogen and of carbon in the body.
- (vi) (a) What is essential to the formation of bones ?
- (b) What should you do to keep your skin healthy ?
- (c) How many blood groups are there ? Name them.
- (d) What are internal secretions ?
- (e) When does a plant (i) take in and (ii) give out carbon dioxide.
- (f) What is the advantage of pruning a plant and when should it be done ?

Ans. (i) Since the earth moves on its axis from west to east, therefore while facing the target to the north, one must aim a bit towards the east i. e., towards one's right, for during the fraction of time it takes to reach the target, the target has moved a bit towards the east. The bullet cannot be aimed towards the left, i. e. towards the west, as the target would have already passed that point before the bullet reaches it.

(ii) (a) It has been observed that living cells are more resistant to X-rays than malignant one's so that deep seated growths are successfully attacked and often dispersed or destroyed. This is deep X-ray therapy to cure some intractable diseases.

(b) B. C. G. vaccination for tuberculosis.

(c) Paludrine for malaria.

(d) Penicillin injections are given to prevent the growth of certain bacteria many of which are harmful to man e.g., some of the staphylococci and streptococci, and the organisms of pneumonia, gonorrhoea, meningitis, anthrax and tetanus.

(e) Sulphetrone is one of the best medicines for Pneumonia and Septic fevers.

(f) Insulin injection for diabetic patients.

(iii) (a) Infra Red Rays are invisible heat rays beyond the red end of the visible spectrum. It is the infra rays which falling on anything heat it.

(b) The ultra-violet rays are that part of the solar spectrum beyond its violet end which is invisible to the eye, but affects a fluorescent screen and possesses strong chemical properties. It is these rays' long exposure to skin which causes sunburn and the formation of vitamin D.

(c) The Atom bomb is a bomb produced in a Uranium pile and derives its explosive force from nuclear fission. It were such atom bombs which wiped out Hiroshima and Nagasaki in Japan in 1945.

(d) Television is the name given to the reproduction by wireless of scenes enacted at a distance.

(e) Dynamite is a high explosive consisting of a mixture of nitroglycerine and kieselguhr, first devised by Alfred Nobel.

(f) A Typhoon is a violent hurricane which occurs in the Chinese seas generally towards the end of the hot season.

(iv) (a) So as to gain momentum.

(b) The force of atmospheric pressure (which is 15 lbs. per square inch) can support a column of 32 ft. of water, so that if the piece of paper covers the water tightly, and there are no air bubbles between it and the water, the atmospheric pressure will support the column of water in the tumbler if the inversion is done very carefully.

(c) The ordinary thermometers measure long ranges of temperature, therefore they have long tubes and big bulbs containing a fair quantity of mercury. They also require a fairly long time to reach the temperatures required to be measured. To obviate these defects a *Clinical thermometer* is used to measure the temperature of the human body. As its bulb is very small and thin it attains the temperature of the patient in half a minute.

The scale goes from 95° F to 110° F only, for it is within this range that the human body can remain cold or hot. Beyond this range there is little chance of its survival. Hence for convenience sake this range is adhered to.

(d) Due to the pressure the wire puts on the ice block, it cuts its way through the block, but at the same time due to its pressure and friction it releases minute droplets of water. Now these droplets due to the surrounding cold get congealed and form ice

again, so that as the wire slowly cuts its way downward, the wire cut block solidifies and remains as one solid piece as before.

(c) We may place the paper box containing water in a current of gas and slowly warm it and go on turning the bag so that it is not affected by heat at one point and char it. The gas may be sufficiently heated to boil the water inside the box. The paper will be burnt only if the ignition point is reached at some points, but as constantly moving water inside takes away its heat, that point is not reached.

(f) Phosphorus takes fire spontaneously in the air at ordinary room temperature, hence it is kept under water with which it does not combine.

Sodium is kept under kerosine with which it does not combine. It is not kept under water like phosphorus, because it vigorously reacts with water forming sodium hydroxide and hydrogen. It is also not kept in the open, because it picks up even the little moisture in the air and rapidly tarnishes.

(g) Washing soda consists of crystals of sodium carbonate decahydrate ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$), while caustic soda is a chemical compound of the formula NaOH . The former gradually loses nine-tenth of its water if its crystals are merely exposed to dry air while the latter, i.e. the caustic soda absorbs as much moisture as possible from the air and turns liquid.

The solution of caustic soda is very corrosive and destroys clothes etc. in a very short time. Hence it cannot be used for washing purposes.

(h) A fuse wire is a wire of short length and of fairly high resistance fitted to a fire-proof frame and fixed between terminals. If the current carried by the fuse exceeds the fixed value, the fuse melts and thus disconnects the current. The fuse thus helps to save the wires carrying the current from getting hot and causing a fire. The fuse by melting and disconnecting the wires prevents this occurrence.

(i) Black lead is graphite, a form of pure carbon, while red lead is an oxide of lead.

(v) (a) (i) Compact heavy materials fall the fastest in air (ii) All fall with equal speed in a vacuum.

(b) There are two systems followed in scientific works. One is the C. G. S. system, in which the Units are centimeters, gram and second. The other is the British system. In it length, mass and time units are : a foot, a pound and a second. This is called the Foot-Pound-Second system.

(c) A Solid is a matter which has a fixed shape and a fixed volume which cannot be altered except by applying a definite force.

A liquid has no shape but has a fixed volume which cannot be altered except by applying a definite force.

A gas has neither fixed shape nor a fixed volume and fills the whole of any space in which it is set free.

(d) A blanket is a bad conductor, so air is entangled within it, so it will not allow the outside warm air to pass through it and melt ice, neither will the air entangled in the blanket serve as a conductor and thus melt ice.

(e) Acids have the following chief characteristics :

1. Acids turn blue litmus (which is a vegetable dye) red.
2. All acids give hydrogen when solutions of them are poured upon certain metals.

Thus sulphuric, nitric, hydrochloric acids, and even weak acids like boric acid produce hydrogen with metals.

3. All acids combine vigorously with alkalies and produce salts.

4. Solutions of acids conduct electricity better than does water and are decomposed by the electric current.

5. All acids, except the weakest, have a sour taste.

(f) Those which contain mostly fats, oils and sugars which give him warmth, energy and nourishment at the same time.

(g) Nitrogen is the essential element in nitrogenous foods that build up the body, while carbon is the essential constituent of food that serves as a fuel.

(iv) (a) Lime salts, like calcium sulphate and calcium carbonate (in addition to salts of fluorine, chlorine and magnesium) are essential for the formation of bones.

(b) For the health of the skin the following measures may be adopted : (1) Sufficient light (2) Plenty of fresh air (3) regular exercise, e.g. walking and games (4) correct clothing i.e. light enough to allow the free circulation of air, but warm enough to retain heat in winter (5) personal cleanliness i.e. frequent use of soap and water (6) avoidance of infection (7) rubbing of the skin with oil to save it from roughness and dryness (8) use of disinfectants on the exposed parts of the skin, specially the neck.

(c) There are four blood groups. They are O, A, B and AB.

(d) Internal secretions are the secretions or manufactured substances of glands or groups of cells in animals (including man) which are essential to normal health. Thus the lymphatic glands secrete and filter the lymph before they enter the blood stream. The ductless glands, like the thyroid, the parathyroid, the pituitary, etc, produce hormones which are secreted into the blood stream

and these help to regulate many bodily processes. The sex glands or gonads secrete in the female ova or egg cells, and in the case of male, sperm cells needed to fertilize ova before reproduction can take place.

(e) Plants take in carbon dioxide during the process of photosynthesis i.e. when the energy of the sunlight is absorbed by the green cells of the leaves and is used to build up sugar and starch from the carbon dioxide of the air.

Since plants are living things, their cells carry on respiration. They take oxygen from the air for slow oxidation and give off carbon dioxide as a waste gas. While photosynthesis takes place only during the hours when the plant is exposed to sunlight, respiration goes on 24 hours each day that the plant may continue to live.

(f) Pruning is the cutting off of parts of a tree or plant which are of little or no use to its general welfare. This is done to enable more sap and light to reach the rest. The best seasons for the operation are autumn and winter when the natural flow of sap will be least interfered with.

Q. 97. (a) A man steps out of a railway train before it has come to rest. How will he fall ?

(b) Why must you run forward when jumping out from a running car ?

(c) A hare, when being chased by a dog takes good many turns. Why ?

(d) Why does a man move his hands backwards when trying to catch a cricket ball ?

(e) Explain why one fails to climb a greasy post.

(f) Why does a man walking up a hill lean forward ?

(g) Why does a rope dancer use a long pole ?

(h) Why is it safer to ride a motor car than a motor cycle ?

(i) Would you find it easier to swim in the sea water or the river water ?

(j) It has been observed that people in the Dead Sea do not sink. What could this be due to ?

(k) Why is the sky blue ?

(l) Why does the sun look much yellower to us than it really is ?

(m) What do we mean when we say that the temperature under shade of a certain place is 90° and the humidity is 75° ?

(n) A ship passes from fresh water into the sea water. Will it rise higher or sink lower or will its position remain unaffected?

(o) What is a helicopter?

(p) What is meant by calories of food?

Ans. (a) He will fall forward in the direction in which the train was moving.

(b) If there is no running, the feet come to a sudden stand-still, while the rest of the body has still the speed of the running car, the man will fall forward; the running backward to some distance will slowly absorb the speed of the forward momentum on the body, therefore there will be little chance of the fall.

(c) Both the hare and the chasing hound are in motion, but when on the approach of the hound, the hare takes a sudden round leap, he moves in a round circle while the hound, due to his forward motion goes on running forward (Newton's first law of motion). This gives the hare the breathing time to change his direction, while the hound gets away a good distance and has to pursue the hare again.

(d) If the man were not to move his hands, the ball will strike the palms of his hands with its full momentum. By giving a swing to the hands backward it takes a longer time to change the rate of its momentum and thus progressively lessens the intensity of its impact or the force with which it strikes the hands.

(e) Friction on the greased post has been reduced to the minimum, the reaction in this case which enables a man to climb up is much smaller than his weight which pulls him down, therefore he finds it difficult to climb.

(f) A person leans forwards that the vertical line from the centre of gravity of his body may fall within the base of his support. If he were to walk upright, this line through the centre of gravity of his body will fall outside his feet supporting his body and towards his back. There will therefore be a continuous propensity of his rolling over backward.

(g) The rope dancer uses a long pole in order to change rapidly the position of his centre of gravity, so that as he swings to the right or the left the vertical line passing through it remains within the base of his support, that is, the rope.

(h) It is safer to ride a motor car than a motor cycle, because the base of support of the car is wider than the motor cycle. The motor cycle with a small base is much more easily upset than one with a broad base like the car.

(i) The sea water contains much saltish material and therefore is denser than the river water. One can therefore float more easily in sea water than in the river water.

(j) This is because due to excessive quantities of salts in the Dead Sea, the density of the water is very great, hence one does not sink in it.

(k) The white light of the sun is made up of the colours of the spectrum i. e., of rays of violet, indigo, blue, green, yellow, orange and red. Now when the light of the sun passes through the earth's atmosphere it is broken up and scattered by the tiny particles of air and dust and water vapours in it. Since the rays of blue light of the spectrum (i. e., of the total white light of the sun) are much shorter than those of red or orange or green rays etc., so when the light of the sun passes through the earth's atmosphere, the blue part of the white light is of just the wave length to be scattered by the dust and other particles, while the rest of the rays which have longer wave lengths, pass right through the atmosphere. The scattered blue rays thus make the sky look blue.

(l) The sun looks yellow to us than it really is, because the blue part of light has been left behind in the sky itself.

(m) When we say that the temperature of a place is 90° and that the humidity is 75° , we mean that the air has 75 percent or three-quarters of the water vapour that it can contain at a temperature of 90° .

(n) It will rise higher, because of the greater density of the sea water.

(o) A helicopter is a flying machine designed for vertical ascent whose support in flight is derived from the reaction of the air on one or more power driven motors. A helicopter can, however, rise from and alight in a very limited area.

(p) Calories of food are measurements of heat-giving properties of foodstuffs. Thus 1 oz. of proteins or carbohydrates yield 120, and of fat 270 calories.

Q. 98. (A) What are the following diseases? By what medicines are they cured?

1. Cholera.

2. Small-pox.

3. Diabetes

4. Influenza

5. Rabies

6. Enteric fever (Typhoid).

7. Gout
8. Pyorrhoea
9. Plague
10. Tuberculosis
11. Leprosy

B. What—

- (a) is the use of a Paravene ?
- (b) is the action of a depth charge ?
- (c) is the function of a carburettor ?
- (d) are the three electrodes of a wireless ?
- (e) are the two relevant properties of a gyroscope ?

C. (a) What is the difference between welding and soldering.

(b) Why should the cycle pump get hot when the tube is being inflated ?

(c) What is a desert mirage and how is it caused ?

(d) What are X-rays and their uses ?

(e) What is an electric Transformer ?

(f) Why can a big whale weighing 400 tons remain suspended in water with little or no exertion ?

(g) It is not difficult to float a needle on still water, although the density of water is less than that of the metal of which the needle is made. How is this possible ?

(h) Why is a layer of damp-course inserted near the plinth of a building ?

(i) If you go on rapidly twirling a pointed stick like a drill in a hole in a piece of wood, what will happen and why ?

D. Answer the following :

(a) How does a plant manufacture starch and sugar for building up its body ?

(b) Show that the sun is the ultimate source of all life on earth.

(c) If you make a grease-spot on a piece of paper, and hold it so that light falls on it, the greasy part looks darker. Why ?

If next you hold the paper upto the light the greasy part seems brighter than the rest. Why ?

(d) Of what elements are the following substances composed :—

Water, turpentine, cane sugar, the common salt, marble, rock crystal, salt-petre, red lead ?

(e) What is a light year ? What is approximately the distance of the nearest star from the earth ? What is the distance of the moon ? In how many days does it revolve round the earth ?

(f) What are the asteroids, a nebula, the Milky Way, a satellite, comets and meteors ?

Ans. 1. Cholera is an intestinal infectious disease commonly found in India. It occurs by eating infected food. The symptoms are very severe watery diarrhoea and severe vomiting. One of its treatment is Leonard Roger's treatment. Injections of saline fluid is one of the best treatment.

2. Small-pox is an infectious disease causing fever, pain, headache, vomiting. Its most important symptoms are red spots which later become blisters and afterwards are filled with puss. It is caused by a virus. Vaccination is a reliable preventive.

3. Diabetes is a disease of the pancreas in which there is deficient secretion of the insulin (the secretion of the pancreas). The function of insulin is proper utilization of sugar in the body. Hence when enough insulin is not produced there is an accumulation of sugar. The blood becomes loaded with sugar and ultimately it is passed in the urine. Symptoms in the early stages may be visible to the patient but soon the patient is overcome by general debility, has excessive thirst and too much urine is passed. Treatment is regulation of diet and injections of insulin.

4. Influenza is an acute infectious fever caused by a bacillus which is a filterable virus. Its symptoms are : usually headache, catarrh, fever, shivering and aching and general prostration. No effective drug has been as yet prepared to cure it. For the present the best treatment is lying snug in bed ; and plenty of drinks like orange squash, or lemon or barley water.

5. Rabies is another name for hydrophobia. It is a disease transferable to man by the bites of an animal suffering from this disease, usually by a mad dog. For the first six months after the bite symptoms usually do not appear. When they begin, there is spasm of the throat muscles, choking feeling and delirium. Treatment is proper serum injections on formula prepared by Pasteur.

6. Enteric fever or Typhoid is an infectious disease caused by typhoid bacilli. Its early symptoms are headache, lassitude, insomnia and feverishness, later, abdominal distension, enlargement of the spleen, and a rose-coloured rash on the chest and abdomen. The vaccine known as T.A. B. protects against the disease. Treatment requires specialized medical attention ; there is so far no specific treatment.

7. Gout is a painful type of disease of the joints. It is due to excess of uric acid in the blood. Its most clear symptoms are the pain in the joints due to their inflammation. Treatment aims at removing the deposits of urate of soda from the system by diet and drugs.

8. Pyorrhoea is an infection of the gums whose symptoms are easily seen, in that the edges of the tooth sockets begin to bleed easily and pus flows out of the gums and there is foul smell of the discharged blood from the gums. Its cause is the decay of the food matter that gets into roots of the teeth during the process of mastication and insufficient cleansing of the teeth which should be done with any germicidal paste reaching the roots or inside the gums. Its treatment is careful cleansing of the teeth by a dentist.

9. Plague is caused by plague germs which enter the blood stream by the bite of a flea that has already bitten a rat infected with the germs of this disease. Its symptoms are the swelling of the lymphatic glands. Soon fever and a state like drunkenness follows. Prevention is by controlling the rat or exterminating it. Protective inoculation is quite effective.

10. Tuberculosis is caused by the Tubercle bacillus. It may affect any part of the body *e. g.* lungs, intestine, joints etc. Symptoms are : cough, low grade fever, loss of weight, discharge of blood through cough, sweating at night and general exhaustion. B. C. G. vaccination may prevent its development. A new anti-Tuberculosis drug : Isonicotinic Acid Hydrazine has been claimed to be effective in combating the disease, but these are all in experimental stage as yet.

11. Leprosy is caused by the lepra bacillus, a germ similar to that of tuberculosis. It attacks the skin and the nerves. Its symptoms are : Pain and tingling in the affected area ; thickening of the skin, ulceration of the body, loss of hair, offensive perspiration, loss of feeling and decay of the parts. Many drugs are being given to patients to cure the disease but none effective has as yet been invented.

B. (a) The paravane is used to remove mines from a ship's path by deflecting them along a wire and severing their moorings. (b) The action of the depth charge is to destroy a submerged submarine by exploding bombs below the surface of the sea and as near the located submarine as possible. (c) The function of a carburettor is to project minute droplets of fuel into the air passages of the cylinders, so that a suitable explosive mixture may be formed for ignition by the sparks.

(d) Wireless waves as they are transmitted to the receiving station have high frequencies as well as low frequencies. It is the

low frequency waves that contain the transmitted intelligence to the receiving station. This is done by means of a detector—a one way device—consisting of one or more valves. The simple “diode” valve will suppress the requisite frequencies, conveying the remainder on for conversion. This is our two electrodes, but to boost the current to the strength to enter the speaker, a triode with three electrodes is used.

There are therefore the 3 electrodes of the wireless valves.

(e) One of the properties of a gyroscope is that it is able to rotate in any plane. The second property is what is called precession i.e. when a force is applied to it which tends to alter the plane in which it is rotating, i.e., in other words, tending to change the direction in space of its spinning wheel, the gyroscope resists this force and tends to rotate about an axis at right angle to the original axis.

C. (a) The difference between soldering and welding is that in soldering two metallic surfaces are joined by a *fusible metallic cement*, while in welding metallic pieces are joined together by *hammering* them after softening them by heat or by brazing or riveting. There is no fusible metallic cement in between them in welding.

(b) This is due mostly to the contraction of the air as it is repeatedly forced through the valve of the pump. This follows the law that a gas cools when it expands and gets hot when it is made to contract.

(c) A mirage is an optical illusion seen usually at day time in sandy wastes when the sun is high and burning bright. This is an inverted image of an object at a distance caused by the refraction of light from the cooler and denser upper layers of the air to the hotter and rarer layers immediately above the hot burning sands.

We may explain the phenomenon thus: Suppose a man is riding on a hot burning desert plain. The layer of air next the ground will be hottest and the layer above this will be cooler. So a ray of light, say from a palm tree, is gradually bent until the angle at which it enters the hottest air is so small that it is totally reflected. It then rises till it meets the eye of the rider. Consequently, the rider sees an inverted tree like a reflection in water. The sky too is reflected from the layers of hot air and its bright reflection is so like water that it looks as if one is nearing some lake.

(d) X-rays are radiations in the electromagnetic spectrum which are next to ultra-violet rays in the direction of the shorter wave-length. They are identical in character with wireless and light waves, but very much shorter. They can penetrate bodies which are opaque to ordinary light. This property is taken

advantage of in radiography, when the bones of human bodies or some extraenous solid matter in any part of the human body is clearly revealed in an X-ray photograph.

(e) An electric transformer is an electrical contrivance consisting of two coils for increasing or decreasing the voltage of an alternating current supply. Transformers are used to convert the very high voltage currents, which are the most economical to transmit, to the ordinary voltages which alone are suitable for use at sub-stations. Thus a current of 1 ampere at 130,000 volts could be turned into a current of 650 amperes at 200 volts.

(f) The whale contains an immense quantity of oily blubber inside its body which is very much lighter than water, hence it can float easily on water of the ocean.

(g) This can be explained by the phenomenon of surface tension. The surface film of water can support an appreciable weight. It is therefore not difficult to float a needle on still water, although the density of steel is about 7.8 and though also the weight of the needle is enough to force the surface molecules apart and let it through.

(h) Bricks and mortar are porous and so the water of the soil rises through them by capillary action and keeps them constantly damp. To prevent this happening *damp-course* consisting of some non-porous material is inserted between two rows of bricks just above the soil-level.

(i) This will make the wood catch fire. The energy of the motion of the rapidly twirling pointed stick becomes heat energy and since wood is a poor conductor of heat, this accumulates and the wood finally catches fire.

D. (a) Plants make the energy derived from the light of the sun the source of the starch and sugar they manufacture. The green leaf of a plant is an instrument for using this energy of light to cause the gas carbon dioxide present in the air, and water from the soil, to combine and make starch and sugar.

(b) All animals living on the earth, live on nothing else but plants or other animals which have fed on plants ; consequently the whole animal kingdom is dependent for food on the plant kingdom and the plant kingdom in turn on light of the sun to build itself up from air and water. So every one of us depends for our food on the energy of light and therefore on the sun, which is the source of this light.

(c) This is because it lets some of the light through, whereas the non-greasy part reflects it almost back to our eyes. This loss of some part of the rays of light makes it look darker than the rest of the surface of the piece of paper.

If we hold the paper up to the light, the greasy part looks brighter than the rest because when we look from the back side of the paper, more light comes to us through it than through the non-greasy part.

(d) Water is compound of hydrogen and oxygen ; turpentine of carbon and hydrogen ; cane sugar of carbon, oxygen and hydrogen : the common salt of sodium and chlorine ; marble of calcium, carbon and oxygen ; rock crystal of silicon and oxygen ; saltpetre of potassium, nitrogen and oxygen : saltpetre of potassium, nitrogen and oxygen : red lead of lead and oxygen.

(e) A light year is the distance which light (in a vacuum) traverses in a year at the rate of 186,000 miles per second.

It is equal to 5,880,000,000,000 miles.

The nearest well known star is the famous Dog-Star, also called Sirius. It is 86 light years away from the earth.

The moon is at a mean distance of 238,860 miles from the earth. It revolves round the earth in 27.32 days, but owing to the simultaneous movement of the earth in its own orbit round the sun : the moon does not return to a similar position, relative to the sun's rays until 29.53 days later. Thus the interval between two new moons is 29.53 days.

(f) Asteroids are numerous small planetary bodies, not visible to the naked eye which revolve round the sun between the orbits of Mars and Jupiter.

Nabulae are luminous masses of gaseous matter seen through the telescope, either spiral or chaotic in form.

The Milky way is a long and luminous track consisting of gaseous matter with small stars seen on dark nights along the middle of the sky.

A satellite is a secondary celestial body which revolves round a planet, just as the latter revolves round the Sun. Thus the Moon is a satellite of the Earth.

Comets are luminous bodies moving round the sun in highly eccentric orbits. Usually a comet contains a nucleus, an enveloping haze and a long thin tail.

Meteors are small pieces of solid matter usually containing iron, chromium, nickel and magnesium which shoot through the earth's atmosphere leaving a luminous trail behind. We also call them "shooting stars" though they are not really stars.

WORLD'S FAMOUS SCIENTISTS AND THEIR CONTRIBUTIONS

Ampere. Andre Marie (1775-1836). French. He was the first to express the relations between the direction of a current in a conductor and the direction of the lines of force. He was also distinguished for his discoveries in electro-dynamics and magnetism and the influence of these on electro-telegraphy.

Anderson, Carl David (1905-). American. He is well known for his extensive researches on cosmic rays. Meson or the Fundamental particle of matter, also once called mesotron, was discovered by Anderson in 1936, in cosmic rays. Received the Noble Prize in 1936.

Angstrom, Anders Jonas (1814-74). A distinguished Swedish physicist who did notable work in spectroscopy and solar physics. In his honour and after him is named the Angstrom unit, used to express the wave-length of electro-magnetic radiations (light, radiant heat, X-rays). One Angstrom unit is one ten-thousandth of a micron (a micron being one millionth of a meter.)

Appleton, Sir Edward Victor (1892-). British physicist who won in 1947 Nobel Prize for studies in ionosphere which led to the development of radar. He developed the British radar system.

Archimedes (287-212 B.C.) of Syracuse. The greatest mathematician of antiquity. He discovered the relationship between buoyancy and displacement of fluids (Archimedes Principle). He also discovered the laws of the lever. He is also inventor of the Archimedes' screw consisting of a revolving spiral in a cylindrical case for raising water.

Arkrigh, Sir Richard (1732-1792). English. Inventor and manufacturing pioneer who invented the spinning frame and helped to bring about the Industrial Revolution.

Arrhenius, Svante August (1859-1927). Swedish. He originated the theory of the electrolytic dissociation, which laid the foundations of modern Physical chemistry.

Avogadro (1776-1856). Italian scientist who advanced the hypothesis that at the same temperature and pressure equal volumes of different gases contain equal number of molecules.

Bacon, Roger (1214-1292). English. He is one of the most original and bold thinker of the Middle Ages. Led to modern system of scientific research by attempting to prove every scientific

statement by experiment. He is the first man who suggested such inventions as the telescope, the air pump, the diving bell, the camera obscura and gun powder; contributed immensely to the general advancement of scientific thought.

Baer, Karl Ernst Von (1792-1826). German. Great German Zoologist, who laid the foundations of comparative embryology.

Baird, John Logie (1888-1946). Scotch. To Baird goes the honour of inventing Television, which is the world's modern wonder.

Banting, Frederick G. (1891-1941). Canadian. He, along with Prof. Macleod, Dr. Best and others discovered method of isolating insulin, a hormone from the pancreas of animals. His discovery has thus enabled millions of patients suffering from diabetes to live normal lives.

Beaufort, Admiral Sir Francis (1774-1857). English. Invented the Beaufort scale, a system of recording wind velocity. Devised in 1806, it received international recognition in 1874.

Becquerel, Antoine Henry. (1852-1908) French. Becquerel is renowned for his discovery in 1896 of the *Becquerel rays*, the first indications of radio-activity.

Behring, Emil Von (1854-1917). German. Developed an antitoxin to prevent and cure diphtheria. The serum he invented makes persons immune to this fell disease.

Bell, Alexander Graham (1847-1922). American (U.S.A.). He invented the telephone and photophone and devised improvements in the phonograph.

Bessemer, Sir Henry (1813-97). Inventor of the Bessemer process for converting molten pig iron into steel. The process has revolutionized the iron and steel trade.

Blakett, Patrick Maynard Sturat (1897). English. Many discoveries in nuclear physics stand to his credit.

Bose, Sir Jagdish Chandra (1858-1937). Indian. Sir Jagdish showed to an astonished world that plants respond to electrical stimuli like living beings, and have nervous system in them. He also invented the Cresograph, a device for measuring the plant growth.

Niele Bohr, Prof. Danish nuclear physicist and winner of the Nobel Prize for Physics in 1933. He has become the first winner of the "Atoms for Peace" Award. The award, established in 1955 through a grant by the Ford Motor Co., grew out of President Eisenhower's appeal at the Geneva Conference for an international effort in the development of nuclear energy for peaceful uses. Prof. Bohr (71), one of the founders of modern atomic theory, won the Noble Prize for theoretical

work on the structure of the atom and the basic concept of quantum physics. During World War II, he worked on the atom bomb at Los Alamos, New Mexico.

Boyle, Robert (1627-91). Irish. He discovered the elasticity of air, and in 1662 enunciated the famous *Boyle's Law*, that the volume of a gas varies inversely with its pressure.

Bunsen, Robert Wilhelm (1811-1899). German. He is credited with the invention of the Bunsen burner. He also invented the charcoal pile, the magnesium light, and founded the study of spectrum analysis.

Burbank, Luther (1849-1926). American (U.S.A.). He produced new fruits and vegetables by applying laws of heredity to plants. Known as the wizard of the plant kingdom.

Braille, Louis (1800-52). French. Though not a scientist he however invented a system of writing, printing and musical notation for the blind. The *Braille system* represents letters or musical symbols by different arrangement of six raised points that can be readily embossed on paper, and identified by touch.

Carrel, Alexis (1873-1944). French. Studied living cells and tissues, specially the surgery of blood-vessels. Helped develop such antiseptic as the Carrel-Dakin solution.

Cartwright, Edmund (1743-1823). British inventor. His most outstanding invention is the power loom on which modern loom is based. He also invented a wool combing machine, agricultural machinery etc.

Cavendish, Henry (1731-1810). English. He discovered the composition of nitric acid and the composition of water. He was also the first to analyse the composition of the atmosphere.

Celsius, Andres. (1701-44) well known Swedish astronomer, the inventor of the centigrade thermometer in 1742.

Clerk, James Maxwell (1831-79) Famous British physicist, one of the great mathematical physicist of all time. His fame rests on his vigorous formulations of electro-magnetic field theory and the theory that light is electro-magnetic in nature. He also wrote papers on colour vision and colour blindness.

Cockroft, Sir Johan Douglas (1897-). English. He is one of the greatest of living scientists. In 1932, with E.T.S. Walton, he succeeded for the first time in splitting the nucleus of the atom, and latterly worked in preparing atom bombs.

Compton, Arthur Holly (1892-). American Physicist. He shared in 1927 Nobel Prize for discovery of *Compton effect*; and increase in wave lengths of X-rays on collision with electrons of atoms of low atomic weights.

Copernicus, Nicolaus (1473-1543). Polish. Copernicus is the founder of modern astronomy. It was he who first announced that the sun is the centre of the solar system and planets circle round it.

Coulomb, Charles Auguste de (1736-1806). French scientist who invented the torsion balance for measuring the force of electric and magnetic attraction, and which goes by his name.

Count Rumford (1753-1844). American. He observed that heat was produced by mechanical energy in the boring of a cannon, thus proving that heat is not matter, but a form of energy.

Crompton, Samuel British inventor who improved weaving methods, especially by the spinning "mule", combining features of Hargreave's spinning Jenny with Arkwrights frame.

Curie, Marie Skłodowska (1868-1934). Polish. She is famous for her researches in radio-activity. She first separated and isolated the element radium, with Pierre Curie ; and discovered the element polonium.

Daimler, Gottlieb (1834-1900). German. Motor-car pioneer. In 1886, Daimler produced the first "motor vehicle" and a motor bicycle. He is also credited with the original invention of the internal combustion engine.

Dalton, John (1766-1844). English. He is remembered for formulating the atomic theory of chemical composition.

Darwin, Charles (1809-1882). English. Darwin is the founder of the modern theory of evolution.

Davy, Sir Humphrey (1778-1829). English. He invented the arc light and the Davy Safety Lamp.

Forest, Lee De (1873-). American. Invented the audion bulb which made possible radio transmission and reception.

Descartes, Rene (1596-1650). French. Descartes is regarded as the discoverer of Analytical Geometry and the founder of the science of optics.

Dewar, Sir James (1842-1923). British chemist. He specialized on the properties of matter at low temperatures. He was the first to liquify hydrogen (1898) and to solidify it (1899). He devised the D flask, forerunner of the modern Thermos bottle.

Diesel, Rudolf (1858-1913). German. He is the inventor of the well known engine that uses heavy liquids and goes by his name.

Dunlop, John Boyd (1840-1921). Scotch. He is the inventor of theumatic Pnerubber tyres.

Edison, Alva (1840-1931). American. One of the most inventive genius the world has produced. Invented the phonograph, the incandescent electric lamp, multiplex telegraphy, moving picture camera. More than 1000 (including minor and major) inventions are to his credit.

Eckener, Dr. Hugo Van. Famous German Aeronaut and engineer. Designer and commander of the Graf Zeppelin in all her flights. Regarded as the greatest authority in the world on dirigibles.

Eddington, Prof. Sir Arthur Stanley (1882-1944). English. Celebrated modern astronomer and physicist. He did work of the highest importance in regard to the motion and equilibrium of stars, their luminosity and atomic structure.

Ehrlich, Paul (1854-1915). German. His most famous invention is Salvarsan—an arsenic preparation—treatment of the most dreaded of diseases, i.e., syphilis, which gives so excruciating a pain to the patient.

Einstein, Albert (1879-1955). German-Swiss Jew. Famous for his framing the theories of Relativity.

Fahrenheit, Gabriel (1686-1736). German. He designed the thermometer scale bearing his name and made the first mercury thermometer.

Faraday, Michael (1791-1867). English. Discovered electro-magnetic induction, which resulted in the development of the first electric generator. Built the first dynamo. Also, in chemistry he made many notable discoveries, e.g., the liquification of chlorine.

Ferrel, William (1817-91). American meteorologist; who formulated the well known Ferrel's Law; that because of the earth's rotation, moving bodies (like winds and ocean currents) are deflected to right in the northern hemisphere, and to the left in the southern hemisphere, and that the amount varies with velocity of motion and latitude (it is zero at the equator and greatest at the poles).

Fischer, Hans (1881-1945). German chemist, who discovered the red colouring matter in blood.

Fleming, Sir John Ambrose (1849-1945). English. Sir Fleming is famous for his researches in electrical engineering, particularly in connection with wireless telegraphy, telephony, and electric light. He was the inventor of the thermionic valve and thus helped in the development of the radio.

Fleming, Sir Alexander. English. (1881-1955). He was one of the foremost of bacteriologists. He discovered penicillin, the

wonder drug of our age. Produced the famous antibiotic from the mould, *penicillium dotatum*.

Forbes, George (1849-1936). British physicist who perfected a novel range finder, the carbon brush used in dynamos and electric motors.

Flory, Sir Howard Walter (1898-). English. He along with Sir Alexander Fleming, discovered penicillin, the antibiotic.

Franklin, Benjamin (1706-1790) American. Franklin proved that lightning is electricity. He also invented the lightning rod.

Fraunhofer, Joseph Von (1787-1826)—German. The dark lines in the solar spectrum (called the Fraunhofer lines) that revealed the chemical compositions of the sun's atmosphere, were first accurately mapped by him. He also improved optical glass and made prisms from it that could produce much better spectra than any previously made.

Foucault (1819-68). French. Noted for his determining the velocities of light in air, water and a vacuum. He demonstrated in 1850 that light travels more slowly in water than in air—the ratio of the velocities equals the ratio of the indexes of refraction. He is also noted for his work on electromagnetic fields, but most of all for Foucault's pendulum, which by consistently bearing to the right, proves that the earth is rotating.

Galen (130-200 A. C.) Greek. Earliest man to demonstrate the action of the heart. Taught that blood flowed in the arteries and veins.

Galilei, Galileo (1564-1642) Italian. Known as the father of experimental science, his discoveries and inventions are among the most important ever made. He discovered the laws of (1) freely falling bodies (2) the pendulum. He made the first air thermometer and astronomical telescope. He is also credited with the invention of the hydrostatic balance.

Galvani, Luigi (1737-98) Italian physician. He is remembered for observing contraction of a dead frog's legs when touched with metal. He made an arc of two different metals and used it to cause muscle contraction. He held that tissue was the electricity source, while Volta said it was the arc. Anyway, he is said to have first discovered the galvanic or voltaic electricity in 1762.

Gay Lussac (1778-1850) French chemist. He is best known for the Gay Lussac Law which states that the volume of a gaseous compound is equal to or is less than and has a simple ratio to the sum of the volumes of gases combined.

Gilbert, William (1540-1603) English. He was the first to state that the earth is a great magnet.

Gorgas, William C. (1854-1920) American. Military doctor who discovered that yellow fever is caused by the bite of a mosquito and by his discovery helped in clearing the Panama canal of malaria and made it possible for the digging of the canal. This work had been held up for many years as labour fell like fleas, and there seemed to be no remedy for it.

Gauss, Karl Fredrich (1777-1855). German mathematician and physicist. Even in his boyhood he was an outstanding prodigy and genius. He was the first mathematician to introduce rigour in his proofs. He contributed to topology, astronomy and physics, and did original work in the field of non-Euclidian geometry. The Gauss unit of intensity of the magnetic field, is named in his honour.

Graham, Thomas (1805-69). Scottish chemist. His name is associated with the **Graham's Law**, which states that the rate of diffusion of a gas is inversely proportional to the square root of density.

Guericke, Otto Van (1602-86). German physician who invented the vacuum pump in 1654. He performed the famous experiment in which teams of horses could not pull apart two hollow hemispheres that had been put together and exhausted. He also invented an hygrometer and our electrostatic machine.

Gay Lussac, Joseph Louis (1778-1850) French physicist and chemist. Best known for his law concerning the combining volumes of gases. Produced new methods of producing sulphuric and oxalic acids.

Haber, Fritz (1868-1934). German. This well known German chemist did much work on gases. The preparation of synthetic ammonia (Industrial chemical process for the large-scale manufacture of ammonia from atmospheric nitrogen is termed after him, as the Haber Process), and nitro-benzene. In the Great War he devised gas masks.

Hailey, Edmund (1656-1742). English. Famous astronomer remembered as having observed the comet (known after him) in 1682 and for accurately predicting in 1704 that it would reappear in 1759, which it did.

Hahn, Otto (1879-), German physical chemist. Discovered the radio-active element protactinium. But more important than this is his obtaining evidence of nuclear fission of uranium by bombarding it with neutrons.

Harrison, John (1693-1776). British inventor, known for his work in the measurement of time. He devised a temperature compensated pendulum.

Harvey, William (1578-1656). English. This celebrated English physician rediscovered the fact that blood circulates through arteries and veins, and passes through capillaries after the ancient work of Galen had been forgotten.

Helmholtz, Herman Von (1821-1894). German. This eminent German scientist published in 1847 the epoch making treatise on conservation of energy. In his "Doctrine of the Sensations of Zones" he proved that the quality of tone depends upon the presence and relative intensity of the various overtones.

Henry, Joseph (1799-1878). American. He invented the first electro-magnetic motor in 1829. He also discovered the principle of electromagnetic induction and perfected a system of fog signals.

Herschel, Sir William (1738-1822). German astronomer, discoverer in 1781 of the planet Uranus and later on, its satellites and also calculated its period of rotation. He also raised the number of known nebulae from 180 to 2500.

Hertz, Heinrich (1857-1894). German. Discovered that the ether waves produced by electrical discharges could be received for examination by an appropriate instrument and thus laid the foundation of the radio.

Hoe, Richard March (1812-86). American. He invented the rotary press in 1846 and also a device to fold newspapers as they came from the press, thus helping in the rapid advance of this industry.

Hopkins, Sir Frederick Gowland O.M.F.R.S. (1861-1947). Eminent English bio-chemist noted for his important work on proteins and vitamins.

Hooke, Robert (1675-1703) English scientist. He was first to formulate the theory of planetary movements as a mechanical problem. He improved astronomical instruments; devised practical telegraphy, invented spiral watch spring; constructed first arithmetical machine and Gregorian telescope. **Hooke's Law** is applied in physics which states that the stress on a body is in direct proportion to strain.

Hughens, Christian (1629-95). Dutch Mathematician and physicist. A very brilliant scientist, he formulated the theory of the compound pendulum. He also proved that Saturn's rings went completely round the planet and also discovered one of its satellites. He was the first to see the now famous nebula in Orion. He designed the **Hughens eyepiece** for reducing spherical aberrations.

Jenner, Edward (1728-1823). English. Jenner is famous for his discovery of modern vaccination, which has helped to stop the spread of smallpox.

Jeans, Sir, James Hopwood (1877-1946), Brilliant British Mathematician and astronomer. He elaborated a tidal theory of the creation of the solar system and has given us some very fascinating books on astronomy: *The Universe Around us*; *The Mysterious Universe*; *The Stars in their Course*.

Jenner, Sir William (1815-1898). Eminent physician who discovered the symptoms which differentiate the symptoms of typhus from typhoid fever.

Joule, James Prescott. (1818-1880). English. Joule investigated the relationship between heat and mechanical work and helped in establishing the law of the conservation of energy. He also determined the mechanical equivalent of heat.

Kelvin, Lord William Thomson (1824-1907) English. In 1857 he laid the first Atlantic submarine cable. He invented many nautical appliances, most important of which were the modern compass, a tide gauge and tide predictor and the electricity meter. He also introduced the Absolute Scale of Temperature.

Kepler, Johann (1571-1630). German. This German astronomer is famous as the discoverer of the 3 laws of planetary motion that bear his name. He ranks as one of the founders of modern astronomy. [The laws are; (1) The orbit of each planet is an ellipse with the sun at one of the foci. (2) The radius vector of each planet describes equal areas in equal times. (3) The squares of the periods of the planets are proportional to the cubes of their mean distances from the sun].

Koch, Robert (1843-1910). German. This German bacteriologist isolated the tubercle bacillus in 1882, the germ that causes pulmonary tuberculosis and invented the tuberculin test by which cattle are now tested.

Lamarck, Jean Baptiste (1744-1829). French biologist. Theories as propounded in his philosophic *Zoologique* have had a profound influence on the theory of evolution as elaborated by later day scientists. Lamarchism may be summarized thus: (1) Changing environments create new needs (2) changed needs create new habits (3) new habits create use and disuse of structures (4) use and disuse of structures lead to structural modification (5) the acquired habits are inherited by the offspring (6) The structural modifications arise earlier and earlier in successive generations until they are finally inherited.

Laplace, Pierre Simon, Marquis de (1749-1827). French mathematician and astronomer. He is remembered for his famous

nebular hypothesis, his studies of the motions of Jupiter and Saturn and of the moon and tide. He invented the Laplace differential equation.

Lawrence, Ernest Orlando (1901—) U.S. physicist, winner of Nobel prize in Physics in 1939. He built the first cyclotron for the production of very high energy (million of electron volts) particles with which he accomplished transmutation of chemical elements and artificial radioactivity.

Lavoisier, Antoine (1743-1794). French. Lavoisier proved that combustion was due to the combination of the burning substance with oxygen, not, as hitherto believed, to the liberation of a fiery substance known as phlogiston. He stated that matter can neither be created nor destroyed.

Leblanc, Nicolas (1742-1836). He devised the method for manufacture of sodium carbonate (Washing Soda).

Linnaeus, Carl (1707-78). Swedish botanist. He is celebrated as the founder of the system of the classification of plants which bears his name and which has formed the basis of modern classification.

Lippershey, Hans Dutch spectacle maker who is said to have discovered the telescope by chance.

Lister, Joseph (1827-1912), English. Lister is the founder of anti-septic surgery, which has made modern surgery so safe by the use of the antiseptics.

Leeuwenhoek, Antony Von (1632-1723). Dutch by birth, he was the first to make powerful lenses and simple microscopes which made him the first man to see protozoa and bacteria, as well as the red blood cells.

Marconi, Guglielmo (1874-1937). Italian. Marconi is the inventor of commercial wireless telegraphy.

Maxwell, J. C. Scottish Physicist (1831-79). He developed the theory of electromagnetic field on mathematical bases. His fame therefore rests on the rigorous formulations of the electromagnetic field theory and the theory that light is electromagnetic in nature. He also wrote papers on colour vision and colour blindness.

Michelson, Albert (1852-1913). American. He is known for his accurate measurement of the speed of light.

Mendel, Gregor (1822-184). Austrian. Mendel's researches on heredity laid the foundation of the modern scientific study of the subject.

Mendeleeff, Dmitri Ivanovich (1834-1907). Russian. He was the first to arrange the chemical elements in a table in

order of atomic mass and to observe the periodicity they displayed when so arranged. It is worthy of note that certain unknown elements were subsequently discovered and found to have the properties assigned to them by Mendeleeff.

Millikan, Robert Andrews (1868-). American. Millikan investigated the nature of cosmic rays. He was the first to isolate and measure accurately the electric charge of an electron.

Maxim, Sir Hiram Stevens. (1840-1916). He invented the maxim machine gun and explosives. His son **Hiram Percy Maxim** invented an automobile and a silencer, for explosive weapons. The most useful is the invention of silencers for gasoline engines.

Michelson, Albert Abraham (1852-1931) U. S. physicist. He was the first American to win the Nobel Prize for physics in 1907. He made the most precise measurement of the speed of light. His famous "ether drift" experiments conducted with Morley led in the end to Einstein's famous Special Relativity Theory. He also measured the tidal effects of the moon on solid crust of the earth.

Morse, Samuel Finley Breese (1791-1872). American. Inventor of the magnetic telegraph and the Code of dots and dashes named after him.

Morgan, Thomas Hunt (1866-1945). American biologist who was awarded the Noble Prize for originating the theory of paired etements within the chromosomes, which govern heredity.

Newton, Sir Isaac (1642-1727). English. Celebrated scientist and mathematician, author of the Law of Universal Gravitation and the three laws of motion which bear his name. He also invented the binomial theorem and the Differential and Integral Calculus. He also discovered the composition of white light, and added greatly to the world's knowledge of optics.

Nobel, Alfred (1833-96). Swedish chemist, world famous for establishing the Nobel prizes awarded every year for the year's most important discovery or invention in the spheres of chemistry, physics and medicine, most distinguished literary work and outstanding service to international peace. Invented dynamite and balistite, a smokeless gun-powder.

Noguchi, Hideyo (1876-1928). Japanese bacteriologist. He did much valuable work in connection with syphilitic diseases and discovered the parasite of yellow fever.

Oersted, Hans Christian (1777-1851). Dutch physicist and chemist. He was the first to isolate aluminium. He is, however, best known for his discovery that a wire carrying a

direct current causes a magnetic needle to take a position at right angles to the wire—a basic fact of electromagnetic induction. The Oersted is the name of the centimeter-gram-second electromagnetic unit of magnetising force.

Ohm, George Simon (1787-1854). German. He discovered the law of conduction known as the Ohm's Law, which states that the strength of an electric current is equal to the electromotive force divided by the resistance of the conductor.

Paracelsus (1497-1547). Swiss German chemist and physicist known for his use of chemicals in medicine *e.g.* arsenic, opium, mercury, iron, sulphur, mineral baths.

Pascal, Blaise (1623-1662). French. Celebrated philosopher and mathematician who proved that atmospheric pressure varies with altitude. He discovered also that enclosed fluids transmit pressure equally in all directions. He also expanded the theory of infinitesimal calculus and mathematical theory of probability.

Pasteur, Louis (1822-1895). French. This celebrated French chemist discovered the causes of fermentation in alcohol and milk and proved that the organisms stimulating it are contained in the atmosphere. Invented by these researches, the method of preservation called pasteurization. He also discovered treatment for hydrophobia.

Pauling, Dr. Linus. American. An expert on the structure of protein molecules. Attached to the Gates and Chellin Chemical Laboratory, California. Awarded the 1954 Nobel Prize for chemistry.

Pavlov, I. P. (1849-1936). Russian physiologist well known for his researches on digestion for which he received the Nobel Prize in 1904. His studies of conditioned reflexes in animals has influenced later writers.

Prout, William (1785-1850). British chemist. He is best known for the hypothesis which bears his name, that hydrogen is the fundamental element and that the atomic weights of all the others are whole number multiples of that of hydrogen.

Perkin, Sir William Henry (1838-1907). English. He was responsible, by his discovery of a mauve dye (1856) for founding the aniline dye industry.

Planck, Max. (1858-1947). German. Author of the Quantum Theory.

Priestley, Joseph (1733-1804). English. He discovered oxygen.

Pupin, Michael (1858-1935). American. Physicist and inventor. He is known for researches in X-ray, for invention of many electrical devices used in telegraphy and telephony.

Raman, Sir C. V. (1882-). Indian. Sir Raman became famous for his discovery in 1929 of the *Raman Effect*, which occurs when light passes through a transparent substance.

Ramsay, Sir William (1852-1916). Well known British chemist; who, together with Lord Rayleigh, discovered argon, manufactured helium, and identified the rare gases neon, krypton and xenon, present in small quantities in the air. He also noted the transmutation of radium into helium.

Rayleigh, John Stuart (1842-1919). British physicist who, along with Ramsay, discovered argon in the atmosphere. He also obtained many important results both by mathematical analysis and experiment, in all branches of physics, specially heat and sound.

Richards, T. W. (1868-1928). U.S. chemist. He made basic contribution to the determination of atomic weights, improved the method of chemical weighing and discovered the isotopes of lead from uranium and thorium. Awarded the nobel prize for chemistry in 1914.

Roemer, Olaus (1644-1710). Danish astronomer, who was the first to measure the velocity of light by a study of the eclipses of Jupiters' satellites.

Roentgen, Wilhelm Konard (1845-1923). Famous German scientist, discoverer of X rays.

Ross, Sir Ronald (1857-1932). India born English physician famous for his work in malaria. He proved that the disease is caused by the bite of a mosquito which carries the malaria germs and this can be eradicated by the suppression of the mosquito.

Rumford, Count (1753-1814). British-American scientist. His great contribution to science was the recognition of heat as a form of energy.

Rutherford, Lord Ernest (1871-1937). New Zealander. A great pioneer of modern atomic science. His main researches were in the field of radio-activity. He was the first to recognise the nuclear nature of the atom.

Schleiden, Malthias (1804-1881). German scientist who proved that all plant tissue is made up of cells.

Schwaan, Theodore (1810-1882). German scientist who made the epoch making discovery that all life begins from a single cell which subdivides many times and ultimately forms the tissues and organs of all plants and animals on this earth.

Selman a Waksman. One of the foremost living U.S. scientists who won the Nobel prize for medicine in 1952 for discovering streptomycin.

Stephenson, George (1781-1848). English. Inventor of the steam locomotive.

Snell, Willebrord (1591-1626). Dutch mathematician, generally credited with the discovery of the laws of refraction of light (1621). Although measurements of the angles of incidence and refraction had been made by ancient philosophers the exact relation between the angle of incidence and refraction was discovered by Snell.

Thomas Godfrey U.S. inventor of the Sextant ; also **John Hedley (England)** invented this instrument, both in 1731.

Thomson, Sir Joseph John (1856-1940). English. His greatest work was done on the conduction of electricity through gases and the structure of the atom. He was the first to discover the electron and he carried out experiments to determine the charge and mass of the electron and devised a method for the analysis of positive rays.

Torricelli, Evengelistia (1608-1647). Famous Italian scientist who invented the mercury barometer by which he proved the existence of atmospheric pressure. This tube is also, sometimes called the Torricellian tube, and the vaccum in such a tube above the mercury column the Torricellian vacuum.

Tyndall, John (1820-1893). Irish physicist, who showed that friction produces heat. His greatest work was in connection with researches into molecular physics and radiant heat, as well as accoustics.

Urey, Harold Clayton (1893-). American. He is the discoverer of "Heavy Water."

Volta, Alessandro (1745-1827). Italian. Volta developed the cell now called the voltaic cell. The volt which is the practical unit of electromotive force is named in his honour.

Vernier, Pierre (1580-1637). French geometer. He invented the instrument known as the Vernier, after him, which is a device for taking readings on a graduated scale to a fraction of a division.

Vornoff, Serge (1866-1951). He is famous for his grafting of animal gland on the human body to rejuvenate it

Watt, James (1763-1819). Scotch. Watt is the inventor of the main features of the modern Steam Engine. The Watt, the unit of electrical power is named in his honour.

Wright, Joseph (1871-1948) and **Wilbur (1867-1911)** are famous Americans : pioneers in flying.

Wilson Dr. C.T.R. English. Inventor of the Wilson cloud chamber, an apparatus for the detection and measurement of the tracks of small particles, especially fundamental particles invisible in microscope or electron microscope. Invented by Wilson in 1911.

Young, Thomas (1773-1829). English physicist and physician, known for his **Young's Modulus**--a number representing (in pounds per square inch or in dynes per square centimeter) the ratio of stress to strain for a wire or bar of a given substance. He was the first person to state the Young-Helmholtz theory of colour vision, studied structure of the eye, and described astigmatism.

Zepplin, Ferdinand (1838-1947). German airship pioneer, whose airships threw bombs on London during 1st World War.

Soddy, Frederick (1877-) British chemist and physicist, winner in 1921 of Nobel prize in Chemistry for his work on isotopes. In 1922 he predicted that helium would be found to be a by-product of radio-active transformations.

Muller, Paul (1900-) Swiss chemist known for his synthesis of D.D.T. and the demonstration of its insecticidal properties.

Solvay, Ernest (1832-1922). He invented the ammonia-soda process for manufacturing sodium carbonate (i.e. washing soda).

INSTRUMENTS AND APPARATUSES USED FOR DIFFERENT PURPOSES

Purpose	Instrument or apparatus used
1. Listening to the action of the heart and chest organs.	... Stethoscope
2. Recording the behaviour of the heart (i.e. force, rate etc. of the hearts' movements)	... cardiograph.
3. Recording Earth Tremors	... Seismograph
4. For seeing a minute object invisible to the naked eye	... Microscope
5. For converting pulses of sound waves into equivalent electrical impulses	... Microphone
6. For measuring atmospheric pressure	.. Barometer
7. For measuring the speed of a gas, specially of winds	... Anemometer
8. For ascertaining the height above the ground in an aeroplane	... Altimeter, a special type of aneroid barometer
9. For measuring speed of motor cars	... Speedometer
10. For knowing approximately the North-South direction of a place	... Compass
11. To spark plugs to ignite the air fuel mixture in an internal combustion engine	... Magneto
12. Instrument for making very small measurements with the greatest accuracy	Micrometer
13. Optical instrument that unites two similiar pictures to give illusion of depth.	... Stereoscope
14. For measuring rate of flow of electric current in amperes	... Ammeter
15. For detecting small currents of electricity	... Galvanometer

16. For measuring difference of voltage or electrical potential ... Voltmeter
17. That changes light waves into electrical impulses ... Iconoscope
18. Testing milk ... Lactometer and
... Lactoscope
19. For listening to sound transmitted through water ... Hydrophone
20. For detecting the presence of submarines ... Do.
21. For measuring the relative humidity of the atmosphere ... Hygrometer
22. For changing the direction of flow of an electric current ... Commutator
23. For detecting radio-activity ... Geiger Counter
- 2.4 For restoring lung movements to paralysed muscles, specially in poliomyelitis ... Iron lung
- 2.5 The machine that enables heavier... The steelyard and
articles to be weighed with a compara... the weighing
tively much smaller weight ... machine
26. The apparatus that proves that at any place in a liquid the pressure is acting equally in all directions ... Manometer
27. The machine in which a much smaller force applied upon a column of liquid is converted into a much larger force available on another column of the... The Hydraulic
liquid connected to the first Press
28. Apparatus for finding the densities of liquids and solutions ... Hydrometer
29. The instrument used by submarines submerged in water to view objects on the surface of the ocean ... Periscope
30. The apparatus used for comparing... Hare's apparatus
the specific gravities of any two liquids or Walts' Hydro-
meter
31. The engine cooling apparatus in a motor car ... Radiator
32. Instrument for measuring the heat intensity of the sun's rays ... Electrometer

33. For measuring and comparing the viscosities of different liquids ...Viscometer
34. Recording the varying atmospheric pressure on a paper ...Barograph
35. Producing high vacuum ...Rotary vacuum pump or mercury diffusion pump
36. Transferring liquid from a higher to a lower level Siphon
37. For finding very high temperatures ...Pyrometer
38. The instrument that gives the highest...Maximum and the lowest temperature reached in...Minimum ther- a period of time mometer
39. Measuring the co-efficient of apparent...Weight Thermo- expansion of liquid ...meter
40. Finding the thermal expansion of a gas...Gay Lussac's under constant pressure apparatus
41. Apparatus that determines the number of calories given off by a substance in combustion or a chemical reaction ...Calorimeter
42. For measuring specific heat of gases at...Regnault's appara constant pressure ...tus
43. Measuring the heat value of foods ...Bomb-calorimeter
44. Determining the latent heat of fusion of ice or of water ...Copper calorimeter
45. Detecting feeble heat rays ...Differential air thermometer
46. For detecting and measuring heat rays ...Thermocouple and thermopile Balometer
47. The engine that uses heavy oil ...Diesel engine
48. Comparing the velocities of sound in two media, e.g., in air and in the solid of a rod or in two gases ...Kundt's tube
49. For recording and later reproducing the same sound ...Gramophone
50. Instruments used in ships to determine latitude and longitude .. Sextant
51. Dispersion of light ...Prism

52. Measuring strength of acids ...Acidimeter
53. For examining the spectra of glowing bodies ...Spectroscope
54. For viewing spectra and measuring the refractive indices of materials ...Spectrometer
55. The instrument by which distant and far off objects are made to give a magnified image which reveals details unobservable by the naked eye ...Telescope
56. A simple device for producing electrical charges ...Electrophorus
57. The special type of microscope for observing virus which cannot be seen with an ordinary microscope ...Electron microscope
58. The apparatus by which small forces can be accurately measured ..Torsion balance
59. Instrument for comparing the magnetic moment of magnets ...Oscillation magnetometer
60. Finding the angle of inclination of a magnetic needle of a place ...Dip Circle
61. The battery that produces an electric current by the use of one plate of zinc and another of copper immersed in sulphuric acid ...Voltaic cell
62. The machine that converts mechanical into electric energy ...Dynamo
63. The revolving coil in an electric motor or generator ...Armature
64. The atomic furnace in which atomic fission takes place ...Nuclear Reactor
65. The apparatus which mixes a liquid fuel such as petrol with the proper amount of air to make an explosive mixture ...Carburetor
66. The tube in which electrons are caused to travel at high speed ...Cathod-ray-tube
67. The electrical and magnetic machine which accelerates atomic particles to bombard nuclei of atoms ...Cyclotron
68. The device which uses short radio waves to detect and locate objects in dense fog or darkness ...Radar

68. The apparatus carried aloft by a balloon to report on pressure, temperature and humidity of the upper air ... Radiosonde
69. Measuring rainfall ... Rain Gauge
70. Prospecting for oil ... Aero-magnet
71. The device used by scientists carrying its own oxygen and fuel supply for exploring the upper atmosphere ... Rocket
72. Instrument for automatic regulation of temperature ... Thermostat
73. Instrument to register temperature movements for meteorological purposes ... Thermograph
74. The electrical contrivance which increases or decreases the voltage of an alternating current supply ... Transformer
75. The aeroplane in which propellers rotate horizontally ... Helicopter
76. The box used to preserve foodstuffs by providing a storing place in which the temperature is kept at a permanent low level ... Refrigerator
77. Apparatus for generating gases such as carbon dioxide or hydrogen sulphide ... Kipp's Apparatus
78. The precise instrument (clock) for measuring time, specially used in navigation ... Chronometer
79. Electrostatic instrument to measure... potential difference of electricity ... Electrometer or volimeter
80. Surveying instrument for measuring horizontal and vertical angles ... Theodolite
81. For comparing the intensities of differing light sources ... Photometer
82. Instrument that can detect even an extremely faint light from a great... distance ... Photo-electric photometer

NAMING DISCOVERERS OR INVENTORS

Laws, discovery, invention etc. etc.	Inventor or Scientist
1. The three basic laws of motion	... Kepler
2. Laws of electrolysis	... Michael Faraday
3. Vacuum above a mercury column in a barometer	... Torricelli
4. The laws of universal gravitation	... Sir Isaac Newton
5. White light is made up of seven different colours	... Sir Isaac Newton
6. That combustion is due to combination of the burning substance with oxygen and not any fiery substance like the supposed phlogiston	... Lavoiser
7. That the 9th and outermost planet in the solar system is Pluto	... W. Jombaugh
8. Penicillin	... Sir Alexander Fleming
9. X-ray	... Wilhelm Roentgen
10. The treatment of syphilis	... Paul Ehrlich
11. Telephone	... Alexandar Graham Bell
12. The first practical demonstration of actual television	... J. L. Baird
13. That the volume of a gas varies inversely with its pressure	... Robert Boyle
14. Discovery of radium	... Madame Curie
15. The circulation of blood	... William Harvey
16. Practical wireless	... Marconi

17. Discovery of aniline in coal tar and aniline dyes ... Hofmann
18. That lightening is nothing but electricity ... Benjamin Franklin
19. Pneumatic tyre ... Dunlop
20. The phonograph ... Edison
21. Telegraph or the method of electrical signalling ... Morse
22. Miner's safety lamp ... Davy
23. The Stethoscope ... Laennec
24. Vulcanized Rubber ... Goodyear
25. First successful engine ... Stephenson
26. Sewing Machine ... Howe
27. Production of steel ... Bessemer
28. Motion Picture ... Edison
29. The airplane ... Wright Brothers
30. The discovery of oxygen ... Joseph Priestley
31. The law of combining volume or that volumes of gases that interact to give gaseous products are in ratio of small whole numbers to each other and each has similar relations to volume of product ... Gay-Lussac
32. The first to demonstrate that all bodies, whatever be the difference in their weights, fall to the ground from the same height at the same time. ... Galileo
33. That in the stretching of a spring of wire, *the extension is proportional to the applied force* ... Robert Hooke
34. That the pressure exerted by a liquid depends only on the height of the liquid and not on the shape of the vessel ... Pascal
35. If a body is immersed completely or partly in a liquid, it undergoes a loss of weight, which is equal to the weight of the fluid displaced by the body ... Archimedes
36. Bakelite ... Backeland

37. The gyroscopic compass ... Elmer Ambrose Sperry
38. Submarine ... Holland
39. First successful heavy oil engine ... Diesel
40. Colour photography ... Charles Ires
41. Vaccination for small-pox ... Jenner
42. The atomic theory and the laws of chemical combination. ... Dalton
43. That at the same temperature and pressure equal volumes of different gases contain equal number of molecules (Note this is called Molecular hypothesis) ... Avogadro
44. Who laid the foundation of organic chemistry and synthesised Urea ... Liebig Wohler
45. Invented the Spectroscope ... Kirchhoff Bunsen
46. The periodic table of elements (that the chemical properties of the elements and their compounds are a periodic function of their atomic weights) ... Mendelyeev
47. Gas-burner ... Bunsen
48. The laws of heredity ... Mendel
49. Antiseptic surgery ... Lister
50. Discovery of the tuberculosis bacteria ... Koch
51. Who invented the process for destroying micro-organisms (bacteria) in liquid foods, specially milk which is named after him. ... Louis Pasteur
52. Who devised anti-rabies treatment ... Louis Pasteur
53. Founder of psycho-analysis ... Sigmund Freud
54. Produced sulphur drugs as bactericides ... Gerhard Domagk
55. Heavy water ... Urey
55. That the sun is the centre of the solar system and the earth revolves around it ... Copernicus
56. The telescope ... Hans Lippershey
57. The origin of species ... Charles Darwin
58. The cause of Malaria ... Sir Ronald Ross
59. Logarithms ... John Napier

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| 60. | Dynamite and smokeless gunpowder | ... Nobel |
| 61. | The Theory of Relativity | ... Einstein |
| 62. | Defined the Absolute Temperature scale | ... William Thomas Kelvin |
| 63. | The Modern Compass | —Do— |
| 64. | Researches in cosmic rays | ... Anderson |
| 65. | The system of writing, printing and musical notation for the blind | ... Louis Braille |
| 66. | The theory of electrolytic dissociation | Aarhenius |
| 67. | Prevention and cure of diptheria | ... Behring |
| 68. | Used the method of grafting to produce new varieties of fruits and vegetables | ... Burbank |
| 69. | Invention of the Centigrade thermometer | ... Anders Celsius |
| 70. | Insulin | ... Banting |
| 71. | Who formulated the law that the rate of diffusion of a gas is inversely proportional to the square root of density | ... Thomas Graham |
| 72. | The Vacuum pump | ... Guericke |
| 73. | The first electro-magnetic motor | ... Joseph Henry |
| 74. | Laid the foundation of the radio waves | ... Hertz |
| 75. | The rotary press | ... Hoe |
| 76. | The law of conservation of energy | ... Joule |
| 77. | The triode | ... Le de Forrest |
| 78. | Cure for yellow fever | ... Hideyo Noguchi |
| 79. | A wire carrying a direct current causes a magnetic needle to take a position right angle to the wire | ... Oersted |
| 80. | The statement that the strength of an electric current is equal to the electromotive force divided by the resistance of the conductor | ... Ohm |
| 81. | That enclosed fluids transmit pressure equally in all directions | ... Pascal |
| 82. | The Quantum Theory | ... Max Planck |

83. The first to measure the velocity of light by a study of the eclipses of Jupiter's satellites ... Roemer
84. That heat is a form of energy ... Rumford
85. That all life begins from a single cell Schwaan
86. Streptomycin ... Selman a Waksman
87. The laws of refraction of light ... Snell
88. The Sextant ... Thomas Godfrey
89. That friction produces heat ... Tyndall
90. The cell which is the practical unit of electromotive force (Voltic cell) ... Volta
90. The instrument that takes readings on a graduated scale to a fraction of a division ... Vernier
91. Grafting of animal glands on the human body ... Serge Vernoff
92. The modern steam engine ... Watt
93. The cloud chamber ... Wilson
94. Synthesis of D.D.T. Paul Muller
95. Atom bomb British and American scientists
96. Nylon ... Wallace Hume Carothers
97. Submarine ... Holland
98. Discovery of Radio activity in Uranium ...Antonie Henry Becquerel
99. The liquification of Helium ... Kamerlingh
1000. Arrangement of chemical elements according to atomic numbers ... Moseley
101. The first to see porotozoa and bacteria ...Leenwenhoek
102. That all life springs only from life and disproved the theory of spontaneous generation ...Redi Francesco
103. The germ-plasm theory of heredity ...Chaim Weizmann
104. The discovery of the bacterium that causes plague ...Kitasato
105. That the disease beri beri is due to the deficiency of the Vitamin B ...Eijkman

106. Intelligence tests ...Binet
107. The cause of the yellow fever ...Walter Reed
108. Researches on pituitary gland and its relation to growth ...Harvey Cushing
109. That the force of attraction or repulsion between two electric charges is inversely proportional to the square of their distance and is directly proportional to their product ...Coulomb
110. Electro-magnetic theory of light ...Maxwell
111. The discovery of electrodes ...Thomson
112. The discovery of the alpha, beta and gama rays emitted by radio active salts ...Lord Rutherford
113. The electron theory of atomic structure...Bohr
114. Invention of the cyclotron for the production of high energy ...Lawrence
115. Discovery of the neutron ...Chadwick
116. Discovery of the positron ...Anderson
117. Discovery of the Cathode rays ...Crookes
118. Electric transformer ...Stanley
119. The laws of and practical calculation method for alternating current ...Steinmitz
120. Manufacturing of washing soda from common salt ...Earnest Solvay
121. Manufacture of ammonia by electrolytic action ...Hall
122. Commercial synthesis of ammonia by the direct combination of nitrogen and hydrogen (Haber process)...Haber
123. The first European to print from movable type ...Gutenberg
124. Steam boat ...Fitch
125. The revolver ...Mc Colt
126. The first to use general anesthetics specially chloroform ...Sir J.Y. Simpson
127. Ether as an anæsthetic ...Long (Crawford Williamson Long)
128. Electrons ...J.J. Thomson

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| 129. The machine-gun | ...Gatling |
| 130. Fountain pen | ...Waterman |
| 131. Typewriter | ...Glidden Sholes |
| 132. Linotype | ...Mergenthaler |
| 133. The Kodak Camera | ...Eastman |
| 134. Rare gases | ...Raleigh and Sir
William Ramsay |
| 135. Oxygen | ...Joseph Priestley |
| 136. Chlorine | ...Scheel |
| 137. Hydrogen | ...Cavendish |

NAMING THE VARIOUS SCIENCES

Subject dealt with	Science
1. Language	... Philology
2. Animal life	... Zoology
3. All living things (including animals and plants)	... Biology
4. Prenatal development or Development of embryo	... Embryology
5. Body structure and structural relationship	... Anatomy
6. Body tissues	... Histology
7. Structure of various animal forms	... Comparative anatomy
8. Mental life	... Psychology
9. Heavenly bodies	... Astronomy
10. Relations between animals and plants and their environments	... Ecology
11. Fossils	... Palaeontology
12. Functioning of the human body	... Human Physiology
13. Study of coins and medals	... Numismatics
14. Carbon Compounds	... Organic Chemistry
15. Birds (their origin, classification, structure and habitat)	... Ornithology
16. Fishes	... Ichthyology
17. Relics of man's past from buried remains in monuments of antiquity	... Archaeology
18. Poisons and their antidotes etc.	... Toxicology
19. Plants	... Botany
20. That deals with the forces existing between the atmosphere and an object when the two are in motion relatively to one another	... Aerodynamics

20. Atmosphere and weather ... Meteorology
21. That deals with matter and energy and the relations between them ... Physics
22. That deals with the nature and composition of matter and changes it undergoes ... Chemistry
23. That is concerned with chemical processes in living organisms and with their organic products ... Bio-chemistry
24. That deals with the fundamental principles that underlie reality ... Metaphysics
25. That treats of the distinction between right and wrong ... Ethics
26. That deals with production, consumption and division of the world's resources ... Economics
27. Numbers (science of spatial and numerical relations) ... Mathematics
28. Properties of Light ... Optics
29. With phenomena connected with the earth's surface ... Geography
30. The structures of the rocks ... Geology
31. Insect life ... Entomology
32. Plant and animal cells ... Cytology
33. Study of fossil plants ... Palaeobotany
34. Structures of animals and plants ... Morphology
35. The science of the sea in all its aspects ... Oceanography
36. Science of sounds ... Acoustics
37. The behaviour and structure of atoms ... Atomics
38. The study of crystals ... Crystallography
39. The Science of inter-planetary flight ... Astronautics
40. The borderland of physics and chemistry ... Physical chemistry
41. The chemistry of the earth ... Geochemistry
42. What the stars are ... Astrophysics
43. The mapping of the sky ... Astronomy
44. What rocks are made of ... Petrology

CHEMICAL NAMES AND CHEMICAL FORMULAE

Name	Chemical name	Chemical formulae
Glaubers' salt	Decahydrated sodium sulphate	$\text{Na}_2 \text{SO}_4 \cdot 10\text{H}_2\text{O}$
Plaster of Paris	Calcium sulphate dihydrate	
Caustic soda	Sodium hydroxide	Na OH
Washing soda	Sodium carbonate decahydrate	$\text{Na}_2 \text{CO}_3 \cdot 10\text{H}_2\text{O}$
Alum	Double sulphate of aluminium and potassium	$\text{K}_2 \text{SO}_4 \cdot \text{Al}_2 (\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$
Laughing gas	Nitrous oxide	N_2O
Oil of vitriol	Sulphuric acid	$\text{H}_2 \text{SO}_4$
Chalk	Calcium carbonate	Ca CO_3
Slaked lime	Calcium hydroxide	Ca (OH)_2
Common salt	Sodium chloride	Na Cl
Lime	Calcium carbonate	Ca CO_3
Quicklime	Calcium oxide	CaO
Baking soda	Sodium Bicarbonate	Na H CO_3
Soda-ash	Sodium carbonate	$\text{Na}_2 \text{CO}_3$
Saltpetre	Potassium nitrate	
White viticol	Hydrated Zinc sulphate	
Green vitriol	Ferrous sulphate	$\text{Fe SO}_4 \cdot 7\text{H}_2\text{O}$
Blue vitriol	Copper sulphate	$\text{Cu SO}_4 \cdot 5\text{H}_2\text{O}$
Alumina or corundum	Aluminium trioxide	$\text{Al}_2 \text{O}_3$
Epsom salt	Magnesium sulphate heptahydrate	$\text{Mg SO}_4 \cdot 7\text{H}_2\text{O}$
Sal-ammoniac	Ammonium chloride	$(\text{NH}_4) \text{Cl}$
Bleaching powder	Chloride of lime	Ca OCl_2
Chile saltpetre or caliche	Sodium nitrate	Na NO_3
Gypsum	Calcium sulphate dihydrate	$\text{Ca}_2 \text{SO}_4 \cdot 2\text{H}_2\text{O}$
Corrosive sublimate	Mercuric chloride	Hg Cl_2
Vinegar	Dilute acetic acid	$\text{CH}_3\text{OC-OH}$
Hypo	Sodium Thiosulphate	
(of photography)	(also called sodium Hyposulphate)	$\text{Na}_2\text{S}_2\text{O}_2 \cdot 5\text{H}_2\text{O}$

THE LAWS OF SCIENCE

1. Archimides Principle

If a body is immersed completely or partly in a liquid, it undergoes a loss of weight, which is equal to the weight of the fluid displaced by the body.

2. Graham's law of Diffusion.

This Law relates to the diffusion of gases through small orifices, and states that gases (at equal temperatures and pressures) diffuse at a rate which is inversely proportional to the square root of the densities of the gases.

3. Newton's Law of Cooling.

The law states that the rate of loss of heat from a hot body placed in still air is proportional to the difference of temperature between the body and the surrounding.

4. Newton's Law of Universal Gravitation.

There exists a force of attraction between any two bodies. This force is directly proportional to the mass of each of the bodies and inversely proportional to the square of the distance between their centres.

5. Hook's Law.

The law states that within the limit of elasticity, the stress on a body is in direct proportion to strain. Stated in other words, it states that extension (be it in springs, wires or elastic bodies) is directly proportional to the applied force.

6. Pascal's Law.

This law states that in an enclosed fluid, if an increased pressure is produced in any part of the fluid, then this change of pressure is transmitted to all the other parts of the fluid.

7. Boyle's Law.

The law states that the volume of an enclosed gas is inversely proportional to the pressure applied to it, if the temperature remains constant.

8. Newton's Laws of Motion.

1st Law. Everything continues in its state of rest or uniform motion in a straight line unless it is acted upon by some impressed force.

2nd Law. The rate of change of momentum of a moving body is proportional to the impressed force and takes place in the direction in which the force acts.

3rd Law. Action and its reaction are always equal and opposite.

9. Avogadro's Law or Hypothesis.

This law, concerning with the properties of gases, states that equal volumes of different gases contain equal number of molecules provided that pressure and temperature are the same.

10. Laws of Chemical Combination.

a. In a chemical reaction, matter is neither created nor destroyed.

b. A chemical compound always contains the same elements united in the same proportion to weight.

c. If two elements combine to form two or more compounds, the two or more weights of the one element that combines with a fixed weight of the other element, bear a simple ratio to one another.

11. Laws of Reciprocal Proportions.

Elements combine in proportion to their equivalent weights.

12. Dulong and Petit's Law.

The atomic weight of an element \times specific heat = 6.4
(approximately)

13. Ohm's Law.

This law states that the ratio of the steady voltage between any two points of a circuit to the direct current flowing between the two points is constant.

This constant ratio is the resistance on the part of the circuit between the two points

$$\text{i.e. Resistance} = \frac{\text{Voltage}}{\text{Current}}$$

14. Kepler's Laws of Planetary Motion.

1. Orbit of each planet is an ellipse of which the sun's centre is one of the foci.

2. Radius vector of each planet (i.e. the line joining its centre with that of the sun) moves over equal areas in equal time.

3. Square of the period of each planets' revolution around the sun is proportional to the cube of its mean distance from the sun.

WHAT THEY ARE AND THE DIFFERENCE IN THEM

1. Hard water Soft water

Hard water is water that will not easily lather with soap but forms a curdy precipitate. It contains soluble calcium or magnesium compounds which make it hard. Soft water is water in which soap will lather easily. It does not contain the above mentioned impurities in it.

2. Ordinary water and Heavy water and Soda water

Ordinary water is hydrogen oxide, a colourless odorless, tasteless liquid of density 1 gm. per c. c., boiling at 100°C . under standard conditions, and freezing at 0°C .

Heavy water is the compound formed by combining deuterium (hydrogen of atomic weight 2 instead of 1) with oxygen. It differs from ordinary water in its density, its boiling point and its melting point. Though both have similar chemical properties, heavy water is said to have distinct physiological actions. "For example it is said to retard germination of seeds and to kill tadpoles etc." which ordinary water does not. Sodawater is ordinary water in which carbon dioxide has been mixed under 3 to 4 atmospheres of pressure.

3. Washing soda—Caustic soda.

Washing soda consists of crystals of sodium carbonate dehydrate. Caustic soda is sodium hydroxide (Na OH .)

Washing soda loses its water on mere exposure to air and falls to a white power, caustic soda on the other hand readily becomes wet owing to the absorption of atmospheric moisture in which it readily dissolves. Caustic soda has a burning effect on flesh, washing soda has none such effect.

Washing soda is a weak alkali, caustic soda is a very strong alkali.

4. Voltmeter—Voltmeter, Wattmeter.

Voltmeter is an instrument for measuring difference of voltage or electrical potential. Wattmeters. These are instruments for measuring domestic and other consumption of electricity. They measure the products of volts multiplied by amperes.

Voltmeter. A voltmeter is an instrument in which products of electrolysis of substances are collected. Thus substances which can be collected by the electrolysis of water in dilute sulphuric acid are oxygen and hydrogen and the apparatus in which this is usually done is a voltmeter.

5. Amorphous—amphoteric.

The term Amorphous is used for the state of any substance in an uncryallised form. An amphoteric substance is one which acts both as an acid and as a base, as an electropositive and as electronegative.

6 Slaked lime and soda lime.

Soda lime is a mixture of caustic soda and quick lime.

Slaked lime is calcium hydroxide made by pouring water on to quicklime.

7. Photometer—Photosynthesis.

Photometer is an apparatus for comparing the intensities of differing light sources.

Photosynthesis is the process of building of carbohydrates by plants containing chlorophyll in the presence of sunlight, by taking carbon dioxide from the air and water from the soil. Chlorophyll is the active agent in this process.

8. Cast iron—Wrought iron.

Cast iron is iron which melts between 1150° to 1250° and is hard and brittle. It contains a fair amount of impurities, especially graphite and silicon.

Wrought iron is a relatively soft iron but is very tough and has a high tensile strength. It is 99.8 to 99.9 per cent pure iron and melts at 1500°C .

9. Epidemic--endemic

Epidemic is the name given to infectious diseases, which arising suddenly in a community rapidly spread through its members after travelling from district to district until a whole country is affected. They may be imported from outside the country. Endemic is the term applied to diseases which affect the inhabitants of certain countries. They arise only from local causes, such as stinking swamps, bad sanitation, impure water, bad climate etc.

10. Steam engine—turbine.

In a steam engine a jet of steam is made to push a piston into a vertical or horizontal cylinder to and fro, by letting the steam first on one side and next on the other opposite side, so as to give the piston rod two side movement within the cylinder, and thus by means of levers it is made to work. In a turbine a rotating motion is given to the blades by constantly injecting the steam on them.

11. Innoculation and vaccination

In inoculation it is the disease germs that are introduced into the human body by hypodermic injection in order to give the subject a mild attack of the disease to prevent his being subsequently liable to a severe attack.

In vaccination only a preparation of a dead bacterium of the variety responsible for the disease is injected into the blood stream in order to increase the person's resistance to the disease.

Product —By product.

Product is the article of commerce produced in the process of manufacturing that article. When a side article is also produced during the process of manufacture of the main article for which the process was undergone, it is said to be a by product. Thus in the process of manufacture of coal gas ammonia sulphate is a by product. So also is basic slag a phosphatic fertilizer obtained as a by-product in the manufacture of steel.

13. Automobile—Automaton.

An automobile is a self propelled vehicle capable of travelling on a road or a field. e.g., a car, a bus etc.

An automaton is a mechanical contrivance which when set in motion reproduces motions of man or animals. "The most remarkable automaton of the 18th century was a duck which dived, swam, ate, drank and by a chemical solution in its stomach digested food."

14. Glider—Helicopter.

A glider is an engineless aircraft similar to an aeroplane which uses gravity and natural air currents to obtain forward motion.

In an helicopter the aircraft obtains lift and propulsion from engine driven motors.

15. Brass—Bronze.

Brass is an alloy of copper and zinc in proportion of 2 : 1. Bronze is an alloy of copper, and tin and only a very small quantity of zinc, normally in proportion of 88 to copper, 10 to tin and 2 to zinc.

16. Artery—vein.

An artery is a blood vessel which carries pure blood from the heart to the body. A vein is a blood vessel which brings back impure blood from the body tissues to the heart.

17. Neap tide—spring tide.

When both sun and moon are on the same side of the earth, as at new moon, the lunar and solar tides are heaped one on the other and a very high tide is formed. This same thing happens when they are on the opposite sides as at full moon. This high tide is called spring tide.

Neap—tide. When these forces are 90° apart and are diametrically opposed a very small tide results. This is called the neap tide.

18. Ports—entrepots.

A port is a city on a sea shore which serves as an entrance for imports from foreign lands and as the place from where commodities of the country are exported.

When a port serves only as a store house for foreign goods which are re-exported to other countries without being unpacked it is an entrepot. The agents and merchants make their profits in the process of re-export of the commodities.

19. Mass and weight.

Mass is the measure of the *quantity of matter* in a body. It is distinguishable from weight which is the *force of gravity* upon a body.

20. Diastolic and systolic blood pressure.

Diastole in the term applied to the dialation of the heart, the auricles and the arteries, as the blood is received. Systole is the opposite process when the heart contracts to pump the blood out.

21. Velocity and speed.

Speed is the rate of motion of a body. Thus it may be 1, 2, 3 or any number of miles per hour. Velocity is the speed of a body, but it is in a certain specified direction. Thus if a ship sails away at the rate of 20 miles per hour, we know its speed alright, but to express its velocity we must say 20 per hour due east, north or west.

22. Noise and sound.

The word sound is used to denote the physical entity which produces in us the sensation of hearing. When it is an over loud or disturbing sound it is called noise.

23. Kinetic energy and potential energy.

Kinetic energy is the energy possessed by a moving body in virtue of its *motion* and due to which it has the ability to do work. Potential energy is the reserved energy possessed by a body at rest due to its *position* with respect to another. Thus water high

up in a dam possesses potential energy, and when it flows down a dam it possesses kinetic energy.

24. Electric dynamo and electric motor.

An electric dynamo is a machine, which, when rotating transforms mechanical energy into electrical energy. This electricity is generated by the influence of magnetic fields and the power may come from steam, gas, petrol or water. In an electric motor, electricity is passed through the machine with the result that its armature rotates and its motion is used to operate other machinery. Thus the dynamo converts mechanical energy into electric energy, while the electric motor converts electric energy into mechanical energy.

25. Angle of Incidence—Angle of reflection.

Angle of incidence is the angle between a ray of light striking a reflecting surface and perpendicular to the surface at that point.

Angle of reflection is the angle between a ray of light sent away from a reflecting surface and perpendicular at that point.

26. Strain and stress.

Stress is the system of forces applied to a body. Strain is the change in form or bulk that a body undergoes when subjected to a stress.

27. Jet planes and aeroplanes.

A Jet plane is a plane whose forward motion depends upon the reaction to the force of fastly issuing gases at its rear. The greater the force with which the gases issue at the rear, the greater the forward force of repulsion depending on the third law of motion, that action and reaction are equal and opposite. An aeroplane is worked by a piston engine or turbine. Its lift is due to the rotation of its fast rotating propeller which sets up eddies and pools in the air, so that as it bites into the air, the air on its upper wing gets much rarer than on its undersurface and this acts as a suction pump on the body of the aeroplane and lifts it up and enables it to have motion in the air. Forward motion is got by manipulation of the rudder etc.

28. Loudness and Pitch of sound.

The pitch of a note or sound depends upon the frequency of vibration, the greater the frequency of vibration set up, the higher the pitch and vice versa. Loudness of sound or of a note at any place depends upon the quantity of energy crossing unit area

perpendicular to its surface. It depends on the amplitude of vibrations of the sounding body at the origin and also on the surface area of the vibrating body. At the place where sound is heard, its intensity or loudness depends on the *amplitude* of vibrations of the air molecules. In pitch—to repeat—is the *frequency* of vibration that matters.

29. White and Black.

When a body absorbs all the rays of the spectrum it is black, when it reflects all of them it is white.

30. Power and energy.

Power is the *rate of doing work*, measured in horse power or in watts.

Energy is the ability or *capacity* of a body to overcome resistance and *do work*. It is thus that which can perform mechanical work.

31. Solar and lunar eclipses.

When the moon passes between the sun and the earth, so that the sun is either obscured wholly or partially it is a solar eclipse.

It is a lunar eclipse when the moon passes into the earth's shadow. It may similarly be total or partial.

32. Solution and suspension.

A solution is a homogenous mixture of two or more substances. e.g. a gas in a gas, a liquid in a liquid, a solid in a liquid or a solid in a solid.

If the mixture of two substances is not very intimate, as of earth particles in water, it is a suspension. The dust particles remain suspended in water and may be easily separated by filtration and other methods.

33. Weather and climate.

Weather at a particular place is the combination of all the atmospheric phenomenon existing at one time. It includes temperature, barometric pressure, prevailing wind etc. for a short or at a particular time. Climate is the general condition of a country, with regard to its average temperature, moisture etc. at successive specific periods of the year.

Thus weather on a particular day may be mildly cold, but sunny, but the next day it may be very cold and cloudy. The

climate of a country remains on an average nearly the same year after year. Thus Northern India has a climate cold but sunny in winter, scorchingly hot and dry before monsoons; hot and moist during the monsoons.

34. Antiseptic and prophylactic.

Any thing is antiseptic that kills or arrests the development of bacteria. Thus iodine, nascent oxygen, potassium permanganate, Lysol, Dettol etc are antiseptic in their action.

Prophylactic is anything that guards against disease, e.g. preventive treatment.

35. Mammal and reptile.

Mammals are the highest class of warm blooded vertebrates, whose females have teats to suckle their young. They have highly developed brain, a heavy body and two permanent set of teeth.

Reptiles are animals which move on their bellies, or on small short legs. They are cold blooded vertebrates whose skins are covered with scutes or scales instead of hairs.

36. Deliquescence—Flourescence—inflourescence.

Deliquescence is the property of some substances to take up moisture from the air and become liquid. Example: the table salt, caustic soda. Flourescence is the property of some substances to emit light of a certain wavelength. Visible light, infrared, Xrays, radio waves, cathode rays can all cause inflorescence. Thus if a tube is coated with flourscent powders, then when electric discharge is maintained through mercury vapour in the sealed tube, the ultra violet light so produced, will cause excitation of the coatings, producing flourescent light.

Inflorescence is the term used for the definite arrangement of flowers on a branch or stem. Every plant has its own type of inflorescence.

37. Relative humidity—absolute humidity.

Relative humidity is weight of water vapour in a given volume of air divided by the weight of water vapour required to saturate the same volume of air at the same temperature.

The quantity of water vapour in grams present in one cubic meter of air is called the Absolute Humidity of the air.

Density—Specific gravity.

Density is the mass per unit volume of a substance. It is estimated in grams per cubic centimetre or pounds per cubic foot under normal pressure and temperature.

Specific gravity is the ratio of the weight of a given volume of a substance to the weight of the same volume of some standard substance. The first thus deals with the mass of the body, the second with the weight.

39. Stars—Planets.

Stars are heavenly bodies which glow by their own light like the sun, which is a star.

They are practically fixed in space (though not absolutely). Planets are heavenly bodies which revolve in elliptical orbits round the sun. They do not glow by their own light for they have none. Their glow is due to the reflected light of the sun on their bodies.

40. Stratosphere—Troposphere.

Stratosphere is the region of atmosphere above the zone of winds. Its lower layers are at a height of about 7 miles, rising in equatorial regions. Its farthest limit is about 50 miles from sea level.

The layers of the atmosphere nearest the earth is called Troposphere.

41. Conduction—convection.

Conduction is the transfer of heat from molecule to molecule in substances.

Convection is the process by means of which heat is transferred in gases and liquids by means of currents set up in them.

42. Reflection—Refraction.

Reflection is the "bounding" or turning back of light, heat or sound.

Refraction is the bending of light or other radiant energy waves from a straight path.

43. Isotherms—Isobars.

An isotherm is a line on a weather-map joining points of equal temperature.

An isobar is a line on a weather map joining points of equal barometric pressure.

44. Comets—meteors.

A comet is a heavenly body consisting of diffuse nebulous head and a very long tail, extending in some cases to millions of miles. It travels in an extremely elongated orbit round the sun.

A meteor is a relatively very small body which falls into the earth's atmosphere and becomes red hot due to the heat of friction generated.

45. Infectious—contagious diseases.

When diseases are communicated from one person to another except when this occurs by actual contact, it is called an infectious disease. When it is communicated between persons by actual contact, it is contagious.

Veneral diseases due to co-habitation are all contagious diseases. Diseases like measles, scarlet fever, diphtheria are contagious diseases.

46. Full moon—new moon.

When the moon at the point of its revolution round the earth is between the sun and the earth, its illuminated side is turned away from the earth and we cannot see it. This phase is called new moon, which really should mean no visible moon.

When the earth is between the sun and the moon so that the entire illuminated side of the moon is visible to us, it is full moon.

47. Welding—soldering.

In soldering two metal parts are joined together by means of a fused film of lower melting point alloy. In welding the parts themselves are fused.

48. Velocity—acceleration.

Velocity is the speed of a body in a certain direction. Acceleration is the rate of increase in the velocity of a moving body.

49. Force and Pressure.

Pressure is the force per unit area acting on a surface.

Force is that which changes the state of a body from motion to rest or from rest to motion or alters its rate of motion.

50. Planet and Asteroid.

A planet is a big heavenly body revolving round the sun. An asteroid is a small planetary body revolving about the sun but between the orbits of Mars and Jupiter.

51. Atomic energy and Atomic pile.

Atomic energy is the energy derived by the splitting of the nucleus of an atom.

Atomic pile is the atomic furnace in which the splitting of the nucleus of an atom takes place.

52. Centrifugal force—centripetal force.

Centrifugal force is the force which causes whirling objects to fly away from the centre of rotation.

Centripetal force is the force which tries to pull whirling objects towards the centre of rotation.

Thus these two forces act diametrically opposite to each other.

53. Alpha, Beta and Gama particles.

Ans. The Alpha, Beta and Gama particles are three types of emissions from radio-active materials, like radium or artificially produced heavy elements such as plutonium. They are distinguishable by the fact that an alpha particle has little penetrating power and creates a straight dense track in a Wilson cloud chamber, Beta particles are more penetrating than alpha particles and produce crooked paths in a Wilson cloud chamber. Gama particles have the shortest wave length of all and are therefore the most penetrating of them all.

LITERATURE

PAPERS SET IN VARIOUS COMPETITIVE EXAMINATIONS ON LITERATURE

Q. 1 (a) What is the principal religious book of (i) the Sikhs
(ii) the Muslims and (iii) the Christians.

(b) What are the principal types of classical dances in India ?

(c) State in not more than four lines each who the following persons were and what was their greatest achievement :—

(i) Kalidas. (ii) John Milton. (iii) The principal contents of the Communist Manifesto.

(d) Write brief notes on (i) Bertrand Russel (ii) T. S. Eliot
(iii) Thyagaraja (v) Shankracharya (v) Amir Khusro

(Part (a) and (b) set in National Defence Academy Exam.

June 1958

Part (c) set in Military College Exam. June 1958

Part (d) set in Indian Administrative Services Exam. Sept. 1958)

Ans. (a) Religious book of the Sikhs : Guru Granth Sahib

” ” ” Muslims : The Koran

” ” ” Christians : The Bible

(b) The principal types of classical dances in India are :—

(i) Kathakali of Malabar.

(ii) Bharat Natyam of Tanjore.

(iii) Manipuri of the eastern part of India.

(iv) Kathak of Northern India.

(v) Bhangra of the Punjab.

(c) (i) **Kalidas** is the greatest Sanskrit poet and dramatist of ancient India, who flourished about 400 A. D. in the reign of king Vikramaditya. He is to India what Shakespeare is to England. His greatest masterpieces are : *Shakuntla*, *Raghuvans*, *Malavikagnimitra* and *Vikramorvasiya*.

(ii) **John Milton** is the second greatest poet of England. He is the author of the world famous English epic “Paradise Lost”.

(iii) According to the Communist Manifesto (issued 1848 by Engles and Marx, every development in politics is a “class struggle”, the political struggle between those who work the machines

(the non-money working class called the *proletariat*) and those who own them (the capitalist or the bourgeois); that this struggle would ultimately end in the triumph of the *proletariat* and communism, which is higher stage of socialism. This would function under the slogan "from each according to his abilities and to each according to his needs" and that the state forming such a society would ultimately wither away.

(d) (i) **Bertrand Russel** is one of England's greatest living philosopher and mathematician. His most important works are: *Principles of Mathematics*, *Problems of Philosophy*, *An Inquiry into Meaning and Truth*, *History of Western Philosophy*.

(ii) **T. S. Eliot** is one of the foremost lyric poet of the 20th century. He brought about a revolution in modern English literature with his poems 'The Waste Land, Ash Wednesday and Four Quartets'.

(iii) **Thyagaraja** is one of the greatest poet of Tamil Nad. What is known as Karnatic music today was developed and preserved in Tamilnad by Thyagaraja who gave the present form to this classical music of the South. He also composed songs in Telugu and Sanskrit.

(iv) **Shankracharya** was born in about 788 A.D. He is one of the greatest Hindu teachers and preachers of Vedanta philosophy. He was a Namboodri Brahman from Malabar. His efforts were partly responsible for the disappearance of Buddhism from India.

(v) **Amir Khusro**, also called Tuti-i-Hind, was a great poet in the time of the Slave king Bulban. Panj Ganj is his masterpiece comprising masnavies.

Q. 2. Name the author and state the subject matter of any five of the following :— [Your answer to each part should be in about 6 lines]

- (a) Pauchtantra
- (b) Gitanjali
- (c) Ain-i-Akbari
- (d) The Illiad
- (e) The Social Contract (Le Contract Social)
- (f) Ends and Means
- (g) The Good Earth
- (h) My Experiments with Truth
- (i) The Discovery of India
- (j) A Passage to India

(Indian Administrative Service Exam. 1957)

Ans. (a) The Panchtantra are animal stories in Sanskrit which generally embody teachings to princes in statecraft. It is alleged to have been written or compiled by Vishnu Sharma who lived about 300 A.D.

(b) Gitanjali was written by Sir Rabindra Nath Tagore. It is a collection of mystic poems by the author dealing with the communion of the soul with the great Unknown.

(c) Ain-i-Akbari was written by Abul Fazl. The book deals with the reign of Akbar and gives a very faithful and graphic history of the reign, description of the court of the emperor and his courtiers, the various aspects of the Mughal administration etc.

(d) Illiad was written by the celebrated Greek poet Homer. It is an epic poem in twenty-four books, being a tale of the siege of Troy by the Greeks. The main theme of the story is the elopement of Helen, wife of Menelaus, King of Sparta, with Paris, son of the King of Troy. The Greeks rescued Helen after a siege lasting for ten years.

(e) The Social Contract was written by Jean Jacques Rousseau. It is a treatise on the origins and organization of government and the rights of citizens.

(f) Ends and Means was written by Aldous Leonard Huxley in 1937. It is a mordant criticism of the modern world. In this book he deals with moral values and blends the doctrine of "non-attachment" with pacifism, and Yoga and Vedanta philosophy.

(g) The Good Earth is written by the American novelist Pearl Buck. It describes the rise of Wang Lung, a Chinese peasant, from poverty to the position of a rich landowner, helped by his patient wife Olan. Their vigour, fortitude, persistence, and enduring love of the soil are emphasized throughout.

(h) My Experiments with Truth by Mahtma Gandhi is a revealing autobiography of the great Mahatma in trying to uphold truth and moral force in the face of all sorts of opposition of British authorities in India and his struggles to fight white supremacy and insolence in South Africa.

(i) The Discovery of India by Jawaharlal Nehru is a history of India written by a man infused with new nationalist ideas free from the tutelage and bias of British Historians. He sees India from a new angle of view.

(j) A Passage to India is a novel by E. M. Forster written in 1924. The book depicts very sympathetically Indian life and brings out the snobbery of the British ruling classes in our country. It probes very deeply into the confusions of Anglo-Indian relations of his time.

Q. 3. (a) (i) Give the name of the poet who wrote the song which has been made the National Anthem of India (ii) Name the oldest collection of Vedic hymn (iii) Name Sri Krishna's discourse to Arjuna (iv) The author of Ramcharitmanas.

(b) (i) What great epic did Valmiki write? (ii) Who is the author of the National Anthem of India? (iii) Name an epic poem written by Milton or Homer (iv) What work of Tagore secured for him the Noble prize? (v) Who wrote discovery of India?

(Part (a) set in Military College Exam. 1957

Part (b) set in National Defence Academy Exam. 1957)

Ans. (a) (i) Rabindra Nath Tagore (ii) The Rig Veda (iii) The Bhagwat Gita (iv) Tulsidas.

(b) (i) The Ramayana (ii) Tagore (iii) Milton wrote Paradise Lost and Homer wrote the Illiad and The Odessy (iv) Gitanjali (v) Jawaharlal Nehru.

Q. 4. Who was the author of the following? :—

- | | |
|-------------------------------|--|
| (a) Crime and Punishment | (b) Sons and Lovers |
| (c) Tess of the D'urbervilles | (d) Oliver Twist |
| (e) Paradise Lost | (f) The Tempest |
| (g) Pilgrim's Progress | (h) Gitanjali |
| (i) Don Quixote | (j) Decline and fall of the Roman Empire |

(Indian Administrative Services Exam. 1956)

(a) Fyodor Dostoyevsky (b) D.H. Lawrence (c) Thomas Hardy (d) Charles Dickens (e) John Milton (f) William Shakespeare (g) John Bunyan (h) Sir Rabindra Nath Tagore (i) Cervantes (j) Gibbon.

Q. 5. Who are five of the following and what are their contributions?

- | | |
|------------------|--------------|
| (a) Bhavabhuti | (b) Tacitus |
| (c) Aristophanes | (d) Firdausi |
| (e) Camouns | (f) Calderon |
| (g) Turgenev | (h) Lessing |

(Indian Administrative Services Exam. 1955)

Ans. (a) Bhavabhuti is the celebrated Sanskrit dramatist who flourished in the court of king Yasovardhan in the 8th century A.D.

He is the author of *Mahavira Charita*, *Uttararamcharitam* and *Malati Madhav*, all of which are celebrated classics.

(b) **Tacitus** is the Roman historian who lived during the 2nd century A.D. His works are distinguished for their polish and clarity. Most important are: *Agricola*, a classic biography; *Germania*, an accurate treatise describing Germanic tribal life; *Historia* of which extant parts recount the reigns of Galba through Vespasian and Aunols (12 are extant) covering reigns of Tiberius to Nero.

(c) **Aristophanes**. Greek comic dramatist of Athens. He directed the shafts of his wit against all, of whatever rank, who sought in any way to amend the religious, philosophical, social, political or literary creed or practices of the country. Some of his famous plays are *The Knight's*, *The Wasps*, *The Frogs*.

(d) **Firdausi**. Famous Persian poet who wrote the celebrated *Shahnamah*, called the book of kings. This book relates the history of Persia in 60,000 verses.

(e) **Camouns**. A Portuguese poet, famous for writing the poem: *The Lusiads* (i.e., Men of Portugal). It is Portugal's national epic, and is one among the masterpieces of world's literature. Its hero is Vasco-da-Gama, and his voyage to India is made the occasion for a magnificent review and glorification of Portuguese history, combining in it Christian, as well as Pagan elements.

(f) **Calderon** was a Spanish dramatist (1600—81), who wrote the celebrated philosophical drama: *Life is a dream*. His other well-known works are: *The Prodigious Magician* and *The Great Theatre*. This last one is a religious and allegorical drama.

(g) **Turgenev** (1818—83). Russian novelist famous for such well-known works as *Fathers and Sons*, a vivid story of Russian nihilism and the younger generation; *Virgin Soil* which is a somewhat disillusioned account of the revolutionary movement of 1870 and *A Next Gentlefolk* which is an idealised picture of the old gentry.

(h) **Lessing** (1729—81), a German critic, dramatist and philosopher. His *Laocoon* and *Limits of Poetry and Painting* is one of the most important contributions to European aesthetic theory. It attempts to define the limits of art and free contemporary poetry and the former's dependence on landscape painting. His most celebrated comedy is *Minna Von Baduhelm* in which true love triumphs over an exaggerated sense of honour.

Lessing is an outstanding exponent of German enlightenment, with its emphasis on tolerance, reason and good sense, specially in religion and government.

Q. 6. What do the following books deal with :—

- (i) The Puranas
- (ii) The Jatakas
- (iii) The Odyssey
- (iv) Zend-Avesta

(Indian Administrative Services Exam. 1953)

Ans. (a) The **Puranas** deal with the story of creation and of gods, as also of ancient kings and their dynasties. They are semi-historical.

(b) The **Jatakas** are books that deal with the life story of the Buddha in a number of his births previous to those of the historical Gautama Buddha. They are also called Bodhisattva stories.

(c) **Odyssey** is the world famous Greek epic poem attributed to the poet Homer which records the adventures of Odysseus (Ulysses) on his long journey from Troy. The epic is in 24 books.

(d) The **Zend-Avesta** is the sacred writing of Zoroaster (or Zarathustra) which formed the basis of the religion that prevailed in Persia from the 6th century B. C. to the 7th century A. D. *Avesta* is the text and *Zend* is its interpretation in a more modern and intelligible language. The book is the sacred scripture of the Parsis.

Q. 7. Who wrote the following ? :—

- (i) Divine Comedy
- (ii) Civitas Dei
- (iii) Arthasastra
- (iv) Tartuffe
- (v) Forsyte Saga

(Indian Administrative Services Exam. 1951)

Ans. (i) Divine Comedy by Dante.

(ii) Civitas Dei by St. Augustine.

(iii) Arthasastra by Kautilya.

(iv) Tartuffe by Jean-Baptiste Moliere.

(v) Forsyte Saga by John Galsworthy.

Q. 8. Write notes on the authorship of the following :—

- (a) Gitanjali
- (b) One World
- (c) Anna Karenina
- (d) Social Contract
- (e) Discovery of India
- (f) Arabian Nights
- (g) Gone with the Wind

(Engineering Services Exam. Dec. 1955 & Dec. 1954)
[a—e in 1955, a, e, f and g in 1955]

Ans. (a) **Gitanjali** was written in 1913 by the celebrated Dr. Rabindra Nath Tagore, poet, painter and author, known for his lyrics and songs on nature, childhood and oriental subjects.

(b) **One World** was written by Wendell Wilkie, well known American politician who toured round the world during the 2nd world war. This book is the outcome of his observation about different nations.

(c) **Anna Karenina** is a novel by the great Russian novelist, playwright, short story writer and essayist Count Leo Tolstoy.

(d) **Social Contract** was written by Jean Jacques Rousseau, author and thinker, one of the most influential personalities of his age.

(e) **Discovery of India** was written by our Prime Minister Pt. Jawahar Lal Nehru.

(f) **Arabian Nights'** entertainments is a collection of ancient oriental tales, first collected in its present form about 1450, probably in Cairo.

(g) **Gone With the Wind** is a best selling novel by the American author Margaret Mitchell.

Q. 9. What flaws in speech or writing are indicated by the following epithets ? :—

- (a) Pedantic
- (b) Redundant
- (c) Rigmarole
- (d) Bombastic
- (e) Slipshod.

(Assistant Grade Exam. Dec. 1955)

Ans. (a) In this a writer or speaker uses superfluous or irrelevant words.

(b) In this the speech or writing is full of too much book-learning, and too much fastidious adherence to formal rules.

(c) In this there is too much rambling or meaningless talk.

(d) In bombast the language is marked by insincere, extravagant and high sounding words.

(e) In this the speech or writing shows much carelessness in arrangement. It is quite unsystematic.

Q. 10. Select five of the following and name the author in each case :—

- (i) Arthashastra (ii) Mrichchakatika (iii) Akbar-namah (iv) Ram-Charitmanasa (v) Paradise Lost (vi) A week with Gandhi (vii) Gitanjali (viii) Discovery of India.

(National Defence Academy Exam. June 1956)

Ans. (i) Kautilya (ii) Shudrak (3rd cen. B.C. Note. It is a great drama in ten acts.) (iii) Abul Fazl (iv) Tulsidas (v) John Milton (vi) Mr. Louis Fisher (vii) Dr. Rabindra Nath Tagore (viii) Pt. Jawahar Lal Nehru

11. Q. From where are the following, some of which are translations from the original language into English quoted ?

(a) Thou shalt not bear false witness against thy neighbour.

(b) The proletariat have nothing to lose but their chains. They have a world to win. Working men of all countries unite.

(c) We hold these truths to be self evident, that all men are created equal, that they are endowed by their creator with certain inalienable Rights, that among these are Life, Liberty and the Pursuit of happiness, that to secure these rights, Governments are instituted, deriving their just powers from the consent of the governed'.

(d) 'He is charitable. He can control his passions. He studies the scriptures regularly, and obeys their directions. He is straightforward, truthful and of an even temper. He harms no one. He renounces the things of this world.

(e) This above all—to thine own self be true
And it must follow, as the night the day,
Thou canst not then be false to any man.

(f) 'Do you see the bird, the tree and me ?'
'I see only the bird, not the tree or you.'
'If you see the bird, describe it to me'
'I see only the head of the bird, not its body.'
'Shoot' ! he commanded.

(g) Where the mind is without fear and the head is held high, where knowledge is free, where the world has not been broken up into fragments by narrow domestic walls, where words come out from the depth of truths ;.....into that heaven of freedom, my Father, let my country awake'.

(h) This book was written by me in Ahmednagar Fort prison, during the five months, April to September 1944.

(i) In bidding farewell to the reader, for the time being at any rate, I ask him to join with me in prayer to the God of Truth that he may grant me the boon of Ahimsa in mind, word and deed.

(j)and to secure to all its citizens Justice, social, economic and political ;

Liberty of thought, expression, belief, faith and worship ;
Equality of status and of opportunity of the individual
and the unity of the nation ;

(k)determined to save succeeding generations from the scourge of war, —to reaffirm faith in fundamental rights, in the dignity and worth of the human person, in the equal rights of men and women and of nations large and small.....

(l) So he went off and comforted himself by saying “They were not ripe anyhow”. In the same way some men, when they fail through their own incapacity, blame circumstances.

(National Defence Academy Exam. January 1956)

Ans. (a) It occurs in the Old Testament of the Bible in Deuteronomy Chapter 5, Verse 30.

(b) It occurs in Karl Marx's Communist Manifesto.

(c) Constitution of the U.S.A.

(d) Taken from the Bhagwat Gita.

(e) Part of the famous parting advice given by Polonius to his son Laertus on the eve of his departure for Paris in Shakespear's Hamlet.

(f) Taken from the Mahabharata. It relates the story of Arjun's success in the archery test held by Dronacharya—the preceptor in arms of the Pandavas and the Kauravas.

(g) It is a famous poem by Rabindra Nath Tagore.

(h) The opening sentence of the Preface to Jawaharlal's 'Discovery of India'

(i) The last sentence of Mahatma Gandhi's *Experiments with Truth*.

(j) The aims of the Indian Constitution as set forth in its Preamble.

(k) Taken from the Declaration in the framework of the charter of the United Nations.

(l) Aesop's Fables.

Q. 12. Answer the following questions.

(a) What do the following terms indicate ?

(i) A "Shylock" (ii) A "Judas" (iii) A "Daniel" (iv) A "Don Quixote".

(b) Who created the following characters ?

(i) Rosalind (ii) Tom Sawyer (iii) Hercule Poirot (iv) Sherlock Holmes.

(c) Name the authors of the following :

(i) Gulliver's Travels (ii) Pride and Prejudice (iii) Alice in Wonderland (iv) One World.

(National Defence Academy Exam. Nov. 1956)

Ans. (a) (i) A 'Shylock' stands for a grasping, stony hearted person, in allusion to the Jew in Shakspeare's Merchant of Venice. (ii) A 'Judas' stands for a wretch who would betray you though outwardly showing great love and regard for you. This term has come in allusion to the traitorous disciple who for 30 pieces of silver betrayed Jesus to his enemies, identifying him for capture by kissing him. (iii) 'A Daniel' means an impartial judge. This term is taken from Daniel, a hero of the Old Testament, whose deed and prophesies are recorded in the Book of Daniel. (iv) A 'Don Quixote' means a dreamy, unpractical, but essentially a good man—one with a "bee in his bonnet". This term is in allusion to the crazy knight Don Quixote, the hero of Cervantes' novel of the same name.

(b) (i) William Shakespeare (ii) Mark Twain (iii) Agatha Miller Christie (iv) Arthur Conan Doyle

(c) (i) Jonathan Swift (ii) Jane Austin (iii) Lewis Carrol (iv) Wendell Wilkie.

Q. 13. (a) Name well known works of the following :

(i) Kalidasa (ii) Kautilya (iii) Milton (iv) Thomas Hardy (v) H.G. Wells.

(b) Name the authors of :

(i) Gitanjali (ii) The Ramayana (iii) The Discovery of India (iv) Merchant of Venice.

(c) Name the authors of the following works :

(i) Meghaduta (ii) My Experiments with Truth (iii) Paradise Lost (iv) David Copperfield (v) The Good Earth.

(Military College Examinations.)

Part (a) held in Nov. 1956, Part (b) held in June 1956, part (c) held in January 1956.)

Ans. (a) (i) Shakuntala (ii) Arthashastra (iii) Paradise Lost (iv) Tess of the D'urbervill (v) Things to Come.

(b) (i) Tagore (ii) Valmiki (iii) Jawahar Lal Nehru (iv) W. Shakespeare

(c) (i) Kalidas (ii) Mahatma Gandhi (iii) John Milton (iv) Charles Dickens (v) Pearl Buck.

Q. 14. Who are the authors of the following :

(a) The Republic (b) The Ramayana (c) Othello (d) Paradise Lost (e) She Stoops to Conquer (f) Reflections on the Revolution in France (g) Das Kapital (h) Gitanjali (i) Glimpses of World History.

(Indian Navy Exam. December 1956)

(a) Plato (b) Valmiki (c) William Shakespeare (d) John Milton (e) Goldsmith (f) Edmund Burke (g) Karl Marx (h) Rabindra Nath Tagore (i) Jawahar Lal Nehru.

Q. 15. Who are the authors of the following ? :—

(a) Utopia (b) War and Peace (c) The Story of my Experiments with Truth (d) Pilgrim's Progress (e) Raghuvansa (f) Decline and Fall of the Roman Empire (g) Faust (h) Life of Dr. Johnson (i) King Lear (j) Arthashastra.

(Indian Navy Exam. July 1956)

Ans. (a) Sir Thomas More (b) Count Leo Tolstoy (c) Mahatma Gandhi (d) John Bunyan (e) Kalidas (f) Edward Gibbon (g) Goethe (h) Boswell (i) W. Shakespeare (j) Kautilya.

Q. 16. Name the authors of the following :—

(a) Jungle Book (b) The Pilgrim's Progress (c) Paradise Lost (d) The Vicar of Wakefield (e) Ivanhoe (f) Treasure Island (g) Macbeth (h) In Memoriam (i) Shakuntla (j) War and Peace.

(Indian Air Force Exam. August 1956)

Ans. (a) Rudard Kipling (b) John Bunyan (c) John Milton (d) Goldsmith (e) Sir Walter Scott (f) Robert Louis Stevenson (g) W. Shakespeare (h) Alfred Lord Tennyson (i) Kalidas (j) Count Leo Tolstoy.

Q. 17. Mention the name of the authors of :—

(a) (i) Shakuntla (ii) Kural (iii) Gitanjali (iv) Ram Charit Manas (v) Discovery of India.

(b) Explain briefly the following literary terms :—

(a) Autobiography (b) Classic (c) Epic (d) Fable (e) Lyric (f) Pastoral (g) Satire (h) Synonym (i) Symposium (j) Utopia.

(Part (a) Indian Navy Exam. Dec. 1955 and Part (b) Indian Navy Exam. July 1955).

Ans. (a) (i) Kalidas (ii) Thiruvalluvar (iii) Rabindra Nath Tagore (iv) Tulsi Das (v) Jawahar Lal Nehru.

(b) (i) **Autobiography.** An autobiography is a form of biography (Biography means the history of an individual life, like Boswell's *Life of Johnson*) in which the author is also the subject. Mahatma Gandhi's "My Experiments with Truth" is a good example.

(ii) **Classic** is a piece of literary composition which has achieved a distinguished position in literary history for its superior and marked qualities and has stood the test of time. Kalidasa's *Shakuntla*, Milton's *Paradise Lost* are classics.

(iii) **Epic.** It is a narrative poem in which is treated a theme of one great complex action, in heroic proportions and elevated style. Examples: *Ramayana*, *Mahabharata*, *Odyssey*.

(d) **Fable** is a short allegorical tale in prose or verse designed to convey a moral lesson: Example: Aesop's Fables.

(e) **Lyric.** It is a short poem in which a single emotion, usually personal, is expressed. Example: *Lyrical Ballads* by Coleridge and Wordsworth.

(f) **Pastoral.** It is a poem or play which has a rural setting and deals with the life of actual shepherds and country folk: Examples: Virgil's *Bucolics*, Milton's *Lycidas*, Shelley's *Adonais*, Arnold's *Thyasis*.

(g) **Satire.** A satire is a ridicule directed against society or individuals. Juvenal's poems are great satires, so also writings of Dryden, Pope (*Essay on Man*) and Swift (*Gulliver's Travels*) are greatly satirical.

(h) **Synonym** is a name or word having the same or identical meaning with another. Thus "little" and "small", "sulphur" and "brimstone" are synonyms.

(i) **Symposium.** This term properly means a drinking together, hence a convivial meeting for social and intellectual entertainment, and also a discussion upon a subject etc.

(j) **Utopia.** This is the name given by Sir Thomas More to the imaginary Commonwealth described in his "Utopia". The term has thus come to be applied to dream countries of other writers also, e.g., Plato's "Republic", Bacon's "Atlantis", Campanellas' "City of the Sun".

LITERATURE

LITERATURE

Q. 1. Name the authors of the following works :—

(1) The Dunciad (2) The Charge of the Light Brigade (3) Carnival (4) The Rape of the Lock (5) David Copperfield (6) Robinson Crusoe (7) The Comedy of Errors (8) Jane Eyre (9) The Decline of the West (10) My Country and My People (11) The Sorrows of Werther.

Ans. (1) Alexander Pope (2) Alfred Lord Tennyson (3) Compton Mackenzie (4) Alexander Pope (5) Charles Dickens (6) Daniel Defoe (7) William Shakespeare (8) Charlotte Bronte (9) Oswald Spengler (10) Lin Yutang (11) Goethe.

Q. 2. Who wrote the following ?—

(a) Gitanjali (b) My experiments with Truth (c) Discovery of India (d) Arthashastra (e) Meghdoot (f) Kadambri (g) Chitra (h) Raghu-Vansam (i) Utra-Ram Charita (j) The Hindu View of Life.

Ans. (a) Rabindra Nath Tagore (b) Mahatma Gandhi (c) Jawaharlal Nehru (d) Kautilya or Chanakya (e) Kalidas (f) Bana (g) Tagore (h) Kalidas (i) Bhava Bhuti (j) Dr. Radhakrishnan.

Q. 3. Name the authors of the following works :—

(a) A Tale of Two Cities (b) King Lear (c) The Pilgrim's Progress (d) Comus (e) The Seven Lamps of Architecture (f) Cranford (g) Kidnapped (h) Wilhelm Meister (i) Kubla Khan (j) The Universe Around Us.

Ans. (a) Charles Dickens (b) William Shakespeare (c) Bunyan (d) John Milton (e) Ruskin (f) Mrs. Gaskell (g) R. L. Stevenson (h) J. W. Von Goethe (i) Coleridge (j) Sir James Hopwood Jeans.

Q. 4. Who wrote the following well-known Odes :—

Ode on a Grecian Urn ; Ode to Evening ; Ode to the West Wind ; Ode on the Intimations of Immortality ; Ode to a Nightingale ; Ode on the Death of the Duke of Wellington ; Ode to Melancholy ; Ode to Autumn ; Ode on the Morning of Christ's Nativity ; and Ode to Winter.

Ans. Ode on a Grecian Urn by Keats ; Ode to Evening by William Collins ; Ode to the W. Wind by Shelley ; Ode on the Intimations of Immortality by W. Wordsworth ; Ode to a Nightingale by Keats ; Ode on the death of the Duke of Wellington by Tennyson ; Ode on Melancholy by Keats ; Ode to Autumn by

Keats ; Ode on the Morning of Christs' Nativity by Milton ; Ode to Winter by T. Campbell.

Q. 5. On which of their works the fame of the following authors endures :—

Milton, Defoe. George Bernard Shaw, William Makepiece Thackeray, Charles Dickens, Keats, Dr. Johnson, Goethe, Hardy, Sir Walter Scott, Rudyard Kipling, Voltaire, Gray and Cranmer.

Ans. Miltons' fame rests on his *Paradise Lost* ; Defoe's on *Robinson Crusoe*; G. B. Shaws' on a number of books, most well known of which are *Man and Superman*, *Back to Methuselah*, '*Candida*', '*Pygmalion*', '*Mrs. Warrens' Profession*', '*Major Barbara*' and '*St. Joan*'; W. M. Thackeray's on '*Vanity Fair*'; Dicken's on *Pickwick Papers* and the great novels *David Copperfield*, *Great Expectations*, *A Tale of Two Cities*, *Martin Chuzzlewit* etc; Keats' on his immortal Odes : '*on a Grecian Urn*', '*To a Nightingale*', '*To Autumn*' etc. and beautiful poems like *La Belle Dame Sans Merci*, *Lamia*, *The Eve of St. Agnes*, and *Isabella* etc ; Dr. Johnson's fame rests more on his being a great conversationalist than on his writings though he is also remembered as a great Lexicographer ; Goethe's on *Dr. Faust*; Hardy's on his great novels : '*Far from the Madding Crowd*', '*The Mayor of Casterbridge*', '*Tess of the D' Urberville*', '*A Pair of Blue Eyes*', *The Return of the Native*, '*Jude the Obscure* etc.' ; Sir Walter Scots' on the great "*Waverlys*",—series of historical novels like *Ivanhoe*, *Guy Mannering*, *Rob Roy*, *The Talisman*, *The Fair Maid of Perth*, *Kenilworth*, *Old Mortality* etc. etc.; Rudyard Kipling's fame rests on his short stories, dealing with India, the sea, the jungle and its beasts, the army, the navy and other subjects—*The Jungle Book*, *Kim*, *Puck of Pooks' Hill*, *Captain Courageous*, *City of Dreadful Night* etc.; Voltaire's on his satirical tales '*Zadig*' and '*Candide*' and *The Age of Louis XIV* and '*Letters Philosophiques*'; Grays' on his famous '*Elegy in a Country Churchyard*'; Cranmer's title to fame rests on his being the principal author of the English Liturgy.

Q. 6. What was the name of the :—

(a) Vicar of Wakefield (b) Bride of Lammermoor (c) Count of Monte Cristo (d) Shrew (in "*Taming of the Shrew*") (e) Warden (in Trollope's "*Warden*"), (f) Constant Nymph.

Ans. (a) Dr. Primrose (b) Lucy Ashton (c) Edmund Dante (d) Katharina (e) Mr. Harding (f) Tessa Sanger.

Q. 7. From the following list, select the names of 3 dramatists, 3 satirists, 3 humorists and 3 writers of Detective Fiction.

Charles Dickens, A Christie, Moliere, Pinero, Pastor, E. Waugh, H. Rhode, Leacock, Gibbon, Voltaire, Sophocles, Swift, W. W. Jacobs, R. Austin Freeman and G. Trevelyan.

Ans. Dramatists : Moliere, Pinero, Sophocles.
 Historians : Gibbon, G. Trevelyan, Pastor.
 Humorists : Leacock, C. Dickens. W.W. Jacobs.
 Satirists : J. Swift, H. Rhode, Voltaire, E. Waugh.
 Detective fiction : A. Christie, R. Austin Freeman.

Q. 8. Gray's "Elegy" was written in the Churchyard at :—

Metton Mowbrey, Richmond (Yorks), Richmond (Surrey), Stoke Poges, Slote, Newington.

Name other equally well-known elegies in the English language and their authors.

Ans. Stoke Poges.

Some other well known elegies in the English language are : Milton's Lycidas, Tennyson's In Memoriam, Shelley's Adonais and Matthew Arnold's Thyrsis.

Q. 9. The ancients said that the guests at a banquet should number not less than the Graces and not more than the Muses. What do you know about the Graces and the Muses.

Ans. Graces were the three goddesses of the ancient Greeks, who were the personifications of light, joy and fertility and the inspirers of the arts, sciences and all graceful activities. Their names were Aglaia, the shining one, Thalia, the blooming one and Euphrosyne, the cheerful one.

The Muses in Greek mythology were the nine goddesses of the arts i. e. it were they who inspired artistic creation. The offsprings of Zeus and Mnemosyne, their names and spheres were:

Clio presided over history, Euterpe over music, Thalia over comedy, Melpomene over tragedy, Urania over astronomy. Terpsichore over song and dancing, Polyhonia over sacred hymns, Erato over love poetry, and Calliope over eloquence and epic poetry.

Q. 10. Explain the following :—

(a) A Kathakali dance (b) A Bhajan (c) Blue Stocking (d) Coup de theatre (e) Cock-and-Bull Story (f) A Gamp (g) The Flying Dutchman (h) Dutch Courage (i) Jack-a Lent (j) Jack Tar (k) Saga (l) The Romance Languages (m) Plantonic Love (n) Pick-wickian Sense.

Ans. (a) dance depicting on the stage various important scene from ancient epics and Puranas which had its birth place in Kerala in the Deccan.

(b) A *Bhajan* is a devotional song addressed to a deity or god, as Mira Bai's *bhajan* Jogi Mat Ja, Mat Ja, Mat Ja.

(c) Blue stocking is a term used for a woman having or affecting literary taste.

(p) Cupe de theatre means are unexpected and sensational turn in a play.

(e) A long idle rambling story, or a concocted, incredible story.

(f) An untidy umbrella. The term comes from the untidy cotton umbrella that Mrs. Gamp—a character in Martin Chuzzlewit—always carried with her.

(g) Flying Dutchman—A legendary spectral ship supposed to be seen in stormy weather off the Cape of Good Hope, and considered ominous of ill luck.

(h) Dutch Courage—Courage induced by liquor. This term is in allusion to the drinking habits ascribed to the Dutch.

(i) A butt for every man to throw at.

(j) A common sailor, whose hands and clothes are tarred by the ship's tackling.

(k) Saga—Narrative compositions in prose that were written in Iceland or Norway during the Middle Ages.

(l) Those group of languages which are descended from Latin, the chief of which are French, Italian, Spanish and Provençal.

(m) Platonic love—Love of a purely spiritual character, free from sensual desire.

(n) This is said of words or epithets, usually of a derogatory or insulting kind, that, in the circumstances in which they are applied, are not to be interpreted as having quite the same force or implication as they naturally would have. Thus in an incident as narrated in the *Pickwick Papers* when Mr. Pickwick accused Mr. Blotton of acting in a vile and calumnious manner, Mr. Blotton retorted by calling Mr. Pickwick a "humbug." Both had used the offensive words in a *Pickwickian* sense, that is to say each had, in fact, the highest regard and esteem for each other.

Q. 11. The "Gilly flower" of Medieval romance was a :—

Wallflower, Iris, Lily, Rose, Daisy, Clematis.

Ans. Wall-flower.

Q. 12. In what works do the following literary characters figure, and who were their authors.

(a) Long John Silver (b) Sir John Falstaff (c) Mr. Pickwick (d) Mrs. Gamp (e) Becky Sharp (f) Mrs.

Malaprop (g) Dandie Denmont (h) Dr. Watson (i) D. Artagnan (j) Dobbin (k) Snow White.

Ans. (a) Stevenson's *Treasure Island* (b) Shakespeare's *Henry the IV and V* (c) Dicken's *Pickwick Papers* (d) Dicken's *Martin Chuzzlewit* (e) Thackeray's *Vanity Fair* (f) *The Rivals* by Sheridan (g) *Guy Mannering* by Sir Walter Scott (h) *Sherlock Holmes* by Conan Doyle (i) *Three Musketeers and Twenty years After* by Dumas (j) *Thackeray's Vanity Fair* (k) *Fairy Tales* by Grimm.

Q. 13. George Meredith wrote :—

Mill on the Floss, Brook Kerith, Barchestor Towers, Harry Richmond, Tess of the d' Urbervilles, Hound of the Baskervilles.

Name some other works of G. Meredith.

Ans. *Harry Richmond*. Other works : "*The Egoist*", "*Diana of the Crossway*", "*The Ordeal of Richard Feverel*".

Q. 14. What do you understand by the following ? Give examples of each one of them.

(a) A metaphor (b) A spoonerism (c) A hyperbole (d) A simile (e) An onomatopoeia (f) A Lampoon (g) Malapropism (h) A dilettante.

Ans. (a) A metaphor, "Transferring" ; the application of name of descriptive term to an object to which it is not literally applicable. It is an intuitive perception of the similarly in dissimilars :

In a metaphor the writer would not say "you remind me of a tomb in which my love is buried alive, nor you are like a coffin", but simply, "Thou art the grave where buried love doth live" (Shakespeare),

Other Examples. Life's but a walking shadow (*Macbeth*). A glaring error.

(b) **Spoonerism.** Accidental transposition of initial letters of two or more words.

Examples: Shoving leopard (for loving shepherd).

Has just received a blushing crow.

For real enjoyment give me a well boiled icyle Oxford
Dictionary.)

(c) **A hyperbole.** A figure of rhetoric, implying exaggeration or the magnifying of an object beyond its natural bounds—e.g., "as swift as the wind", 'Light as air'.

(d) A simile. 'Like'. A comparison. Two things or actions are likened to each other either for clearness and ease of explanation or for other poetical explanation.

Example. Loose clouds like earth's decaying leaves are shed (Shelley's *Ode to the West Wind*) ; on the dome of the many coloured glass.

(e) An onomatopoeia 'Name making', the formation of words by the imitation of sounds resembling those associated with the object.

Examples: Murmur, cuckoo, buzzing.

(f) A lampoon. A scurrilous personal piece of satire, generally on some prominent individual. The word is from the French "Lampoon" a drinking song, so called from the exclamation "lampoons". i.e., "Let us drink," frequently introduced into such songs.

(g) Malapropism. The term is derived from a character Mr. Malaprop in Sheridan's *The Rivals*. It stands for the act of misapplying words in the attempt to use fine language.

Example: Wrote Mrs. Lloyd George and company to us :

Sir we can offer you many falicities (facilities) if you agree to be one of our permanent customers.

(h) A dilenttante. One who dabbles in a given subject specially the fine arts for which he has neither ability nor much knowledge.

Q. 15. The First-Folio Shakespeare contains all the plays attributed to him except one of these. Which one ?

Macbeth ; Cymbaline ; Hamlet ; Timon of Athens ; Pericles, Prince of Tyre ; Coriolanus.

Ans. Pericles, Prince of Tyre.

Q. 16. Name the author of each of the following and name another work by each.

(a) In Memoriam (b) Thyrsis (c) King Errant (d) The Iliad (e) Westward Ho (f) The White Company (g) Pickwick Papers (h) It's Never Too Late to Mend (i) Greenmantle (j) Measure for Measure (k) Kim (l) Journey's End (m) Tartuffe (n) Red Star over China (o) Traveller (p) Bright-Day (q) The Cocktail Party.

Ans. (a) Alfred Lord Tennyson ; *The Princess* (b) Matthew Arnold ; *Sohrab and Rustam* (c) Flora Annie Steel ; *On the face of the Waters* (d) Homer ; *Odyssey* (e) Kingsley ; *Life of Nelson* (f) Connan Doyle ; *Sherlock Holms* (g) Charles Dickens ; *David*

Copperfield (h) Charles Reade; *The Cloister and the Hearth* (i) John Buchan; *History of the Great War* (j) William Shakspeare; *Hamlet* (k) Kipling; *Jungle book* (l) Robert Cedric Sherriff; *Greengates* (m) Moliere; *Le Misanthrope* (n) Edgar Parks Snow; *The Political Battle of Asia* (o) Goldsmith; *Deserted Village* (p) Priestly, *They came to a city* (p) T.S. Eliot; *Murder in the Cathedral*;

Q. 17. From the following list select the names of 3 painters, 3 musicians, 3 dramatists, 3 epic writers and three poets.

(1) Elgar (2) Kalidas (3) Tulsidas (4) Keats (5) Rembrandt (6) Milton (7) Beethoven (8) Whistler (9) Wagner (10) Dante (11) Racine (12) Coward (13) Cowley (14) Homer (15) Botticelli (16) Congreve.

Name atleast one work of each of them.

Ans. (a) Dramatists	Kalidasa, Congreve, Racine.
<i>Epic writers</i>	Tulsidasa, Milton, Homer.
<i>Poets</i>	Keats, Dante, Cowley.
<i>Painters</i>	Rembrandt, Whistler, Botticelli.
<i>Musicians</i>	Elgar, Beethoven, Wagner.
(b) Kalidasa	Shakuntla.
Congreve	The Way of the World.
Racine	Andromaque.
Tulsidas	Ramayana.
Milton	Paradise Lost.
Homer	The Iliad.
Keats	Ode on A Grecian Urn.
Dante	Divine Comedy.
Cowley	Poetical Blossoms.
Rembrandt	Anatomy Lesson.
Whistler	The Gentle Art of Making Enemies.
Botticelli	Madonna of the Magnificat.
Elgar	Pomp and Circumstance.
Beethoven	Eroica.
Wagner	The Ring of the Nibelungen.

Q. 18. Who is or was called :—

The Prince of Peace, The Prince Consort, Prince of

nd Dies, Prince of Destruction, Prince of Gossips, Prince of Hell, Prince of Physicians, Prince of Poets, Prince of vegetable kingdom, Prince Imperial.

Ans. Christ is called by the Prince of Peace ; A prince who is the husband of a reigning queen. as Albert of Saxe-Coburg-Gotha, was husband of Queen Victoria and Philip Mountbatten is of Queen Elizabeth II is called Prince Consort ; Beau Burmmel is called the Prince of Dandies, Tamerlane is called the Prince of Destruction ; Samuel Pepys the Prince of Gossips on account of his *Diary* ; Satan the Prince of Hell, Avicenna the Prince of Physicians ; Virgil the Prince of poets ; also Edmund Spenser is so called on his monument ; The palm tree is prince of the Vegetable kingdom so called by Linneaus ; Prince Imperial was the title of the heir apparent in the French Empire 1852-1870.

Q. 19. Four of these occur in the prologue to Chaucer's *Canterbury Tales*.

Miller, Baker, Haberdasher, Squire; Oxford Student, Palmer.

Name them.

Ans. Miller, Haberdasher, Squire, Oxford student.

Q. 20. Name five famous writers of detective stories in English and atleast two works of each.

Ans. (i) *Sir Arthur Conan Doyle*: The Hound of the Baskarvilles, Sherlock Holmes.

(ii) *Dorothy Leigh Sayers* ; The Nine Taylors ; Gaudy Night.

(iii) *Agatha Christie* : The Mysterious Affairs, The Murder of Roger Ackroyd.

(iv) *Edmund Clerihew Bentley* ; Trent's Last-Case, Baseless Biography.

(v) *Edgar Wallace* ; The four Just-men, The Council of Justice.

Q. 21. In what works of fiction do the following characters occur. Name the author of each.

(1) Sam Weller (2) Clara Middleton (3) Diana Vernon (4) Faraday (5) Elizabeth Bennet (6) Dr. Primrose (7) Jeeves.

Ans. Sam Weller—Dicken's *Pickwick Papers*.

Clara Middleton—Meredith's *Egoist*.

Diana Vernon—Sir Walter Scott's *Rob Roy*.

Faraday—Defoe's *Robinson Crusoe*.

Elizabeth Bennet—Jane Austin's *Pride and Prejudice*.
Dr. Primrose—Goldsmith's *Vicar of Wakefield*.
Jeeves—My Man Jeeves by Wodehouse.

Q. 22. Name some well known :—

(1) Biographies (2) Autobiographies written by (1) Englishmen (2) French (3) Germans (4) Indians.

Ans. Biographies

Boswell's life of Samuel Johnson	...	English
Life of Napoleon by Abbot	...	French
Emil Ludwig's Life of Goethe, Bismarck, Hindenburg, Wilhelm II	...	German
The Rebel Leader by Sardul Singh Caveeshar	...	Indian

Autobiographies

Autobiography by Pt. Jawaharlal	...	Indian
Goethe's <i>Dichtung and Wahrheit</i> and Hitler's <i>Mein Kempf</i>	...	German
Cardinal Newman's <i>Apologia Pro Vita Sua</i>	...	English
Somerest Maugham's <i>The Summing up</i>	...	English
Rousseau's "Confessions."	...	French

Q. 23. (a) What famous novelist wrote under the Pseudonym of "Currer Bell," and mention atleast five such other writers and their pseudonyms; except those mentioned below.

George Eliot, Charlotte Bronte, Dickens, Emily Bronte, Katherine Masfield, Edgar Wallace.

Ans. (a) Charlotte Bronte.

(b) (i) Victor Hugo under Paul Foucher.

(ii) Percy Bessy Shelley under Miching Mallecho

(iii) Lord Tennyson under Merlin

(iv) Sir Walter Scott under Peter Pattison

(v) John Galsworthy under John Sinjohn.

Q. 24. Give the general type of books written by each of the following and mention atleast one book by each.

(1) Horald J. Laski (2) Henrik Ibsen (3) Meadows Taylors (4) Dorothy Sayers (5) Marjorie Bowen (6) Euripides (7) Sir James Jeans (8) Sir Philip Gibbs and Mulk Raj Anand.

conception, by a singular privilege and grace granted by God, was preserved free from all stain of original sin;" *Indian file*: The term means: one after the other, or singly, from the practise of the American Indians, who march one by one when they go on an expedition. "The one behind carefully steps in the footprints of the one before and the last man of the file obliterates the footprints. Thus neither the track nor the number of invaders can be traced"; *Indian Summer*: The autumnal summer which is the finest and mildest part of the year, about October; *Socratic irony*: An assumption of total ignorance, to serve as a means of leading on and eventually confuting an opponent; *Dramatic irony*: The theatrical device of making a speaker utter words which have a hidden meaning for the audience of which he is himself unconscious"; *to lift the veil of Isis* is to pierce the heart of a great mystery; *to go to jericho*=to go to an unknown place; *Judas' kiss*: A deceitful act of courtesy, any act of treachery under the guise of kindness; *Judas'-coloured*=having red hair, Judas' traditionally being red haired; The house leek is called *Jupiter's beard* as it was supposed to be a charm against evil spirits and lightning; *a lame duck*: A person who is unable to discharge his obligation; *to give one the lie*: To accuse a person to his face of telling a falsehood; *a lion hunter* is one who hunts up celebrities to adorn or give prestige to a party; *Little Englanders*: A term of approbium for those Englishmen who upheld the doctrine that Englishmen should concern themselves with England only and were opposed to the extension of the Empire; *A pig in a poke* means a blind bargain; *pin money*: A lady's allowance of money for her personal expenditure; *Piso's justice*: Any judgment which on the surface appears to be right, but is morally wrong; *poetic licence*: Liberties with regards to subject matter, grammatical construction, spelling or coining of new words, condoned in the case of a poet when he tries to conform to the exigencies of rhyme and meter: *ships that pass in the Night*—People who come into one's horizon for a while and then pass out of view, to be seen or heard of no more; *To sin one's mercies*.—"To be ungrateful for the gifts of Providence"; *a wild cat scheme*: A rash and hazardous financial venture; *attic salt*: Elegant and delicate wit; wit of a dry, delicate and refined quality, *awkward squad*: Raw recruits not yet fitted to take their place in the ranks; *a bachelor's wife*: "A hypothetical ideal or perfect wife"; *Barmecide Feast*—An illusion, illusory benefits which end in great disappointment.

Q. 26. Name the authors of the following works. State also, in not more than one sentence for each, what they deal with:—

The Anatomy of Melancholy; Cooper's Hill; Vivian Gray; All for Love; Era Lippo Lippi; The Jolly Beggars; Underwood; George Barnwell; Moll Flanders; The Critic; The Task; Manfred; Guy Mannering.

Example

The Shepherd's Calender. Twelve eclogues in various meters by Edmund Spenser, one for each month.

Ans. *The Anatomy of Melancholy* is a prose work by Robert Burton which treats of all phases of melancholy with an abundance of illustrative material from classic resources; *Conper's Hill* is a didactic poem by Sir John Denham combining description of scenery with reflections; *Vivian Gray* is a novel by Disraeli chiefly concerning an intrigue which the very young, gay and talented Vivian Gray persuades the Marquess of Carabas to support against his own government; *All for Love* is a tragedy by Dryden based on the story of Antony and Cleopatra, specially dealing with the last few days of Antony's career; *Fra Lippo Lippi* is the title of a dramatic monologue in Robert Browning's 'Men and Women' in which the painter, speaking to the street guards of Florence, who have come upon him in the midst of a night adventure, gives his biography, and his ideas on life and art; *The Jolly Beggars* is a poem by Robert Burns, which presents a series of songs by a group of beggars who tell variously of their sorrows, their wretchedness, their cinicism and disillusionments and their scorn for the church and wealthy nobility; *Underwoods* is the title of a collection of poems by Johnson; *George Barnwell* is a domestic tragedy in prose by Lillo, in which everyday commercial life is made the theme of a tragedy; *Moll Flanders* is a romance by Defoe written as an autobiography of a woman who leads a licentious life, but amassing wealth through theft passes the rest of her life in opulence though in penitence; *The Critic* is a comedy by Richard Brinsley Sheridan satirizing the sentimental drama and the malignant literary criticism of his day; *The Task* is a poem in six books by Cowper, written with the object, in the poets' own words "to discountenance the modern enthusiasm after a London life and to recommend rural ease, and leisure as friendly to the cause of piety and virtue; *Manfred* is a dramatic poem by Lord Byron in which the hero, guilty of some inexpiable and mysterious crime lives among the Alps as an outcaste and lives a life of remorse, but after some time comes to the Hall of Arimanes where he dies; *Guy Mannering* is a novel by Sir Walter Scotts—it is a tale of the period of George III.

Q. 28. Who wrote the following ?:—

(a) Break, Break, Break

On thy coldrg ey stones o sea

- (b) They also serve who only stand and wait
- (c) More things are wrought by prayer
Than this world dreams of
- (d) Blow, blow thou winter wind
Thou are not so unkind
As man's ingratitude
- (e) God's in his heaven
All's right with the world !
- (f) The paths of glory lead but to the grave
- (g) Falstaff, unimitated, unimitable Falstaff, how shall I describe thee ? Thou compound of sense and vice : of sense which may be admired, but not esteemed ; of vice which may be despised, but hardly detested. "Falstaff" is a character loaded with faults, and with those faults which naturally produce contempt. He is a thief and a glutton, a coward and a boaster, always ready to cheat the weak and prey upon the poor, to terrify the timorous and insult the defenceless. At once obsequious and malignant, yet the man thus corrupt, thus despicable, makes himself necessary to the prince by perpetual gaiety, and by unfailing power of exciting laughter.

Ans. (a) Tennyson (b) Milton (c) Tennyson (d) Shakespeare (e) Browning (f) Gray (g) Dr. Johnson.

Q. 29. In which novel or play do the following characters occur ? Who is the author of each work ?

(a) Goneril (b) Tony Lumpkin (c) Sidney Carton (d) Becky Sharp (e) Doctor Watson (f) Dushyanta (g) Cassio (h) Gora.

Ans. (a) Goneril in Shakespeare's *King Lear*.

(b) Tony Lumpkin in Goldsmith's *She Stoops to Conquer*.

(c) Sidney Carton in Dicken's '*A Tale of Two Cities*'.

(d) Becky Sharp in Thackeray's *Vanity Fair*.

(e) Doctor Watson in *Sherlock Holmes* by Sir A Conan Doyle.

(f) Dushyanta in Kalidasa's *Shakuntala Natak*.

(g) Cassio in Shakspeare's *Othello*.

(h) Gora in Tagore's *Gora*.

Q. 29. Who are the authors of the following works :—

(a) Thus spake Zarathustra (b) Rommel (c) The Conquest of Happiness (d) Under The Moscow Wood Tree (e) Jean Christophe

Ans. (a) Friedrich Nietzsche (b) Desmond Young (c) Bertrand Russell (d) Thomas Hardy (e) Romain Rolland.

Q. 30. What do the following books deal with ?—

(a) The God that Failed (b) Soviet Genetics and World Science (c) The British Family of Nations (d) The Gathering Storm (e) My Country and My People.

Ans. (a) This is a narrative by six well known authors, who state their experience about Communists and Communism and how on getting disillusioned about both rejected this creed. It includes writings by such men as Louis Fischer, Andre Gide etc. (b) *Soviet Genetics and World Science* by Huxley is a refutation of Soviet theory on Genetics as propounded by the Russian scientist Lysenko; (c) *The British Family of Nations* by Coalman deals with the British Dominions in their relation with England, the Mother country. (d) *The Gathering Storm* is the first volume of the War Memoirs by Sir Winston Churchill, dealing with the fateful events, the warlike preparations and blusterings of the Nazi War Lords that were a prelude to and were inexorably leading to the 2nd World War. (e) *My Country and My People* is by Lin Yutang—a Chinese American scholar dealing with China and its people, their ways of life and their beliefs etc.

Q. 31. Who said : "There is but one step from the sublime to the ridiculous" ?

Dr. Johnson, Shakespeare, Napoleon, Carlyle, Lamb, Disraeli.

32. Napoleon.

Q. 32. Name the authors of the following works:—

(a) Ivanhoe. (b) The Mill on the Floss. (c) A Tale of Two Cities. (d) The Forsyte Saga. (e) King Lear. (f) The Pilgrim's Progress. (g) Utopia. (h) The Pied Piper of Hamelin. (i) Mission to Moscow. (j) Light of Asia or The Great Renunciation. (k) The Annals and Antiquities of Rajasthan. (l) Civitas Dei. (m) Virgin Soil upturned. (n) Les Miserable. (o) Gita Rahasya.

Ans. (a) Sir Walter Scott (b) George Elliot (c) Charles Dickens (d) John Galsworthy (e) W. Shakespeare (f) Bunyan (g) Sir Thomas More (h) Robert Browning (i) Joseph Edward Davies (j) Sir Edwin Arnold (k) Col. Todd (l) St. Augustine (m) Turgenev (n) Victor Hugo (o) Bal Gangadhar Tilak.

Q. 34. Complete the names of these pairs of famous lovers :—

(a) Pelleas and (b) Lancelot and (c) Nelson and (d) Antony and (e) Hero and (f) Darby and (g) Hir and (h) Sasi and (i) Baz Bahadur and (j) Laila and (k) Romeo and (l) Orpheus and (m) Abelard and (n) King Edward VIII and

Ans. (a) Pelleas and Melisande (b) Lancelot and Elaine (c) Nelson and Lady Hamilton (d) Antony and Cleopatra (e) Hero and Leander (f) Darby and Joan (g) Hir and Ranja (h) Sasi and Punnu (i) Baz Bahadur and Rup Mati (j) Laila and Majnu (k) Romeo and Juliet (l) Orpheus and Eurydice (m) Abelard and Heloise (n) King Edward VIII and Mrs. Wallis Simpson.

Q. 35. Who wrote :—

(1) Mein Keimph (2) The Waverly novels (3) The Tempest (4) Essay on Man (5) Sartor Resartus (6) Great Expectations (7) Sense and Sensibility (8) The Nigger of the Narcissus (9) Importance of Living (10) Crusade in Europe.

Ans. (1) Hilter (2) Sir Walter Scott (3) W. Shakespeare (4) A. Pope (5) Carlyle (6) C. Dickens (7) Jane Austin (8) J. Conrad (9) Lin Yutang (10) Eisenhower.

Q. 36. In which poems do the following lines occur ?

(1) Half a league, half a league, half a league onward
Into the valley of death rode the six hundred.

(2) O my Love's like a red, red rose
That's newly sprung in June
O my love's like the melodic
That's sweetly played in tune !

(3) The curfew tolls the knell of parting day

(4) Not a drum was heard, not a funeral note
As his corpse to the rampart we hurried
Not a soldier discharged his farewell shot
O'er the grave where our hero we buried

(5) Higher still and higher
From the earth thou springest
Like a could of fire
The blue deep thou wingest

(6) Rule Britannia, rule the waves !
Britons never will be slaves !

- Ans.** (1) Tennyson's *Charges of the Light Brigade*.
 (2) Robert Burns's *A Red, Red Rose*.
 (3) Gray's *Elegy Written in a Country Churchyard*.
 (4) Charles Wolf. *The Burial of Sir John Moore, after the battle of Corrunna*.
 (5) Shelley's *Ode to a Skylark*.
 (6) James Thomson : *Rule Britannia*.

Q. 37. Which of the following characters are from Dickens and which from Thackeray.

Mrs. Malaprop, Mr. Micawbar, Rawdon Crawley, Martin Chuzzlewit, Osborne, Sedley, Mark Tapley, Roger de Coverley, Colonel Newcome, Rip Van Winckle, Sam Weller, Captain Dobbin.

Ans. Dickens : Mr. Micawbar, Martin Chuzzlewit, Mark Tapley, Sam Weller.

Thackeray : Rawdon Crawley, Osborne, Col. Newcome, Sedley, Captain Dobbin.

Q. 38. Supply the appropriate place names to fill the blanks in these lines from famous songs :—

(a) My heart's in....., (b) Come back to....., (c) I'm off to.....in the morning (d) In.....s fair city where girls are so pretty (e) I lost my heart in.....to you dear (f) O, we've come up from.....

Ans. (a) The Highlands (b) Erin (c) Philadelphia (d) Dublin (e) Heidelberg (f) Somerset.

Q. 39. Who were, or are called :—

Father of English poetry, Father of English printing, Father of Comedy, Father of History, Father of his country, Father of the Indian Nation, Father of English Prose, Father of Epic poetry, Father of Modern Prose Fiction, Father Neptune, Father of Tragedy, Father of Poetry, Pilgrim Fathers, Fathers of the Church.

Ans. *Father of English poetry* : Geoffrey Chaucer.

Father of English printing : William Caxton.

Father of Comedy : Aristophanes.

Father of History : Herodotus.

Father of his country. George Washington, the first President of the United States ; Cicero was also so entitled by the Roman Senate. Several of the Caesars were so called e.g., Julius Caesar after he had quelled the insurrection in Spain ; Augustus Caesar,

Father of the Indian Nation : Mahatma Gandhi.

Father of English prose : Wycliffe, also Rogar Ascham.

Father of Epic poetry : Homer.

Father of modern prose fiction : Daniel Defoe.

Father Neptune : The Ocean.

Father of Tragedy : Aeschylus.

Pilgrim Fathers : The first shipload of settlers in Massachusetts. U. S. A., who set sail in the ship *Mayflower* in 1620.

Fathers of the Church : The early Christian writers, the term is usually applied to those of the first five centuries.

Q. 40. Who wrote about :—

(1) Pontagrue (2) Riki Tiki Tawi. (3) Rob Roy (4) Esmond (5) Adam Bede (6) Richard Feverel.

40. (a) Pontagrue—Rabelais.

(b) Riki Tiki Tawi—Rudyard Kipling.

(c) Rob Roy—Sir Walter Scott.

(d) Esmond—Thackeray.

(e) Adam Bede—George Eliot.

(f) Richard Feverel—Meredith.

Q. 41. The following quotations are taken from Robert Burns, Tennyson, Laurence Binyon, William Shakespeare, Alexander Pope, Sir Walter Scott, Keats, and Rudyard Kipling, but not in that order. Write the name of the poet of each poem.

(a) A little learning is a dangerous thing,
Drink deep or taste not the Pierian spring

(b) Had we never lov'd sae kindly
Had we never lov'd sae blindly
Never met—or never parted,
We had ne'er been broken hearted

(c) All the world's a stage
And all the men and women merely players
They have their exits and their entrances
And one man in his time plays many parts
His acts being seven ages.

(d) O hark ! O hear ! How thin and clear
And thinner, clearer, farther going ;
O sweet and far from cliff and scar
The horns of Elfland blowing !
Blow, let us hear the purple glen rippling,
Blow bugle, answer echoes, dying, dying, dying

- (e) The tumult and shouting dies ;
The Captain and the kings depart
Still stands Thine ancient sacrifice,
An humble and contrite heart
- (f) Breathes there the man, with soul so dead,
Who never to himself hath said,
'This is my own, my native land !'
- (g) They shall not grow old, as we that are left grow old
Age shall not weary them, nor the years condemn,
As the going down of the sun and in the morning
We will remember them.

41. (a) Alexander Pope (b) Robert Burns (c) William Shakespeare (d) Alfred Lord Tennyson (e) Rudyard Kipling (f) Sir Walter Scott (g) Laurence Binyon.

Q. 42. In which plays of Shakespeare do these appear :—

- (a) Queen Gertrude (b) Launcelot Gobbo (c) Mercutio
(d) Regan (e) Cleopatra (f) Prince Theseus (g) Desdemona
(h) Brutus

42. (a) Hamlet (b) Merchant of Venice (c) Romeo and Juliet
(d) King Lear (e) Antony and Cleopatra (f) Midsummer Night's Dream (g) Othello (h) Julius Caesar.

Q. 43. Complete the quotations :—

- (a) I polished up that handle so carefully (b) "Here lies our Sovereign Lord the King whose word no man relies on"
(c) "Spare the rod" (d) "When Britain first at Heaven's Command"
(e) "The Walrus and the carpenter" (f) "John Gilpin was a citizen."

43. (a) That now I am the ruler of the Queen's Navee (b) He never said a foolish thing and never did a wise one (c) And spoil the child (d) Arose from out the azure main (e) Were walking hand in hand (f) Of credit and renown.

Q. 44. Who wrote the following ?

- (1) The Struggle for Peace (2) The Indian Struggle (3) War and Peace (4) My Experiments with Truth (5) Robinson Crusoe (6) Wealth of Nations (7) Man and Superman (8) One World (9) Glimpses of World History and (10) An Essay concerning Human Understanding.

44. (1) The Struggle for Peace—Chamberlain.

(2) The Indian Struggle—Subhas Chander Bose.

(3) War and Peace—Count Tolstoy.

- (4) *My Experiments with Truth*—Mahatma Gandhi.
- (5) *Robinson Crusoe*—Daniel Defoe.
- (6) *Wealth of Nations*—Adam Smith.
- (7) *Man and Superman*—Bernard Shaw.
- (8) *One World*—Wendell Wilkie.
- (9) *Glimpses of World History*—Pt. Jawaharlal Nehru.
- (10) *An Essay Concerning Human Understanding*—John Locke.

Q. 45. From the following list choose the painters, writers of short stories, novelists, poets and dramatists or play writers and state the nationality of each. (1) Da Vinci (2) Umar Khayyam (3) Agha Hashr Kashmiri (4) Sur Das (5) Goya (6) Walter Scott (7) Charlotte Bronte (8) Badri Nath Bhatta (9) Corot (10) Nazrul Islam (11) Prem Chand (12) Maithli Saran Gupta (13) Edgar Allan Poe (14) Tagore (15) Sir Anthony Van Dyke (16) Giotto.

45. Painters: Leonardo Da Vinci (Italian); Goya (Spanish Painter and etcher); Corot (French), Sir Anthony Van Dyke (Flemish), Giotto (Florentine).

Short story writers. Edgar Allen Poe (American), Tagore (Indian).

Novelists. Charlotte Bronte (English), Premchand (Indian); Walter Scott (English), Tagore (Indian).

Poets. Umar Khayyam (Persian); Sur Das (Indian); Walter Scott (English); Nazrul Islam (Indian); Maithli Saran Gupta (Indian), Tagore (Indian).

Drâmatists. Agha Hashr Kashmiris (Indian); Badri Nath Bhatta (Indian); Tagore (Indian).

Q. 46. Who created the following characters in fiction?—

(1) Mr. Micawber (2) Falstaff (3) Sherlock Holmes (4) Iago (5) Man Friday (6) Rebecca Sharp (7) Sam Weller (8) Soames Forsyte (9) Sir Pitt Crawley (10) Pecksniff.

46. (1) Charles Dickens (2) William Shakespeare (3) Conan Doyle (4) W. Shakespeare (5) Daniel Defoe (6) Sir Walter Scott (7) C. Dickens (8) John Galsworthy (9) Thackeray (10) Charles Dickens.

- Q. 47.** (a) 'Elementary, my dear Watson
 (b) Yo, ho, ho, and a bottle of rum
 (c) I bring fresh showers for the thirsting flowers
 From the seas and the streams

I bring light shade for the leaves when laid
In their noonday dreams

(d) Something rotten in the state of Denmark.

What books, plays or poems are suggested by the above lines.

47. (a) Adventures of Sherlock Holmes (b) Treasure Island
(c) The Cloud (from Shelley) (d) Hamlet.

Q. 48. What do you understand by the following phrases ?

Peter Funk ; Gabriels' hounds ; gall and wormwood ; the birds of Ganymede ; as good as George-a-Green ; to gerrymander ; to steal the goose and give the gibbets in alms ; Handwriting on the wall ; to bury the hatchet ; to wear hectors' cloak ; Homer sometimes nods.

48. *Peter Funk*. A fake bidder at an auction to whom articles are sold when the price fails to get up sufficiently, and by whom the price is often artificially boosted ; *Gabriels' hounds* means wild geese ; *Gall and Wormwood*. Anything extremely disagreeable and annoying ; *the birds of Ganymede* means Eagles, from the allusion to Ganymede riding to Olympus on an Eagles' back ; *as good as George-a-Green* means one who is resolute minded, one who will do his duty come what may ; *to gerrymander* means to hocus-pocus statistics, election results etc., so as to make them appear to give other than their true results or so as to affect the balance ; *to steal the goose and give the gibbets in alms* mean to amass wealth by over reaching and to save ones' conscience by giving small sums in charity ; *Handwriting on the wall* means an announcement of some coming calamity, or the imminent fulfilment of some doom ; *to bury the hatchet* means to let bygones be bygones ; *to wear hector's cloak* means that you are paid in your own coin ; *Homer some-times nods* means that even the best of us sometimes make mistakes.

Q. 49. What do the following phrases mean ?

(a) *esprit de corpse* (b) *ipso facto* (c) *fait accompli*
(d) *coup d'etat* (e) *carte blanche* (f) *sartor resartus* (g) *par excellence* (h) *bona fides* (i) *post mortem*.

49. (a) Spirit of comradeship as among soldiers or a team
(b) By that very fact, automatically (c) an accomplished action
(d) a sudden overthrow of an established government either by force or by a violent stroke or state policy, as that by which Louis Napoleon subverted the Constitution (Dec. 2, 1851) (e) A blank paper, duly signed, to be filled up at the recipient's pleasure (f) The tailor tailored (g) Pre-eminently (h) good faith
(i) After death.

Q. 50. (a) Who is the creator of "Micky Mouse" ?

(b) "We buried him darkly by the dead of night" a well known poem begins. Buried whom ?

(c) Who wrote :—

(1) Far from the Madding Crowd (2) The Egoist (3) Alice in Wonderland (4) Faerie Queen (5) Unto this last (6) Social Contract (7) Creative Evolution.

50. (a) Walter Disney (b) Sir John Moore.

(c) (1) Thomas Hardy (2) Mercedith (3) Lewis Carrol (4) Edmund Spenser (5) John Ruskin (6) Jean Jacques Rousseau (7) Henre Bergson.

Q. 51. Shakespeare's plays were performed in his life time at the :

yceum, Globe, Scala, Mermaid Tavern, New Exchange, Tabard.

51. Globe.

Q. 52. Who wrote :—

(1) Tess of the D'urberville (2) The Vicar of Wakefield (3) Henry Esmond (4) The Republic (5) Kubla Khan (6) Pride and Prejudice (7) Comus (8) Lays of Ancient Rome (8) Das Capital (10) Tom Jones.

52. (1) Thomas Hardy (2) Oliver Goldsmith (3) William Makepiece Thackeray (4) Plato (5) Samuel Taylor Coleridge (6) Jane Austin (7) John Milton (8) Macaulay (9) Karl Heinrich Marx (10) Henry Fielding.

Q. 53. In which Shakespearean plays do the following occur.

(a) Desdemona (b) Oberon (c) Portia (d) Caliban (e) Sir Roland de Boys (f) Anne Page (g) Goneril.

53. (a) Othello (b) Midsummer Night's Dream (c) Merchant of Venice (d) The Tempest (e) As you like It (f) Merry Wives of Windsor (g) King Lear.

Q. 54. Below are the opening lines of eight famous poems. State in each case the name of the author and the title of the poem.

(i) When I consider how my light is spent
Ere half my days, in this dark world and wide

(ii) O to be in England
Now that April's there

- (iii) There was a time when Meadow, grove,
and stream,
The earth, and every common sight,
To me did seem
Apparelled in celestial light
- (iv) Hence loathed Melancholy
Of Cerberas and blackest midnight borne
- (v) Hail to thee, blithe spirit
Bird thou never were...
- (vi) Earth has not anything to show more fair :
Dull would he be of soul who could pass by
A sight so touching in its majesty
- (vii) My heart aches and a drowsy numbness pains
My sense, as though of hemlock I had drunk
- (viii) There is sweet music here that softer falls
Than Petals from blown roses on the grass
- (ix) Canst thou you minister to a mind diseased
Pluck from the memory a rooted sorrow
Raze out the written troubles of the brain
And with some sweet oblivious antidote
Cleanse the stuffed bosom of that perilous stuff
Which weighs upon the heart ?

54. (i) Milton "On His Blindness" (ii) Robert Browning "Home Thoughts from Abroad" (iii) William Wordsworth: "Intimations of Immortality from Recollections of Early Childhood." (iv) Milton's "L. Allegro." (v) Shelley: "Ode to a Skylark" (vi) Wordsworth: "Upon Westminster Bridge" (vii) Keats' "Ode to a Nightigale" (viii) Tennyson's Lotus Eaters." (ix) Shakespeare's Macbeth.

Q. 55. Mention the most important works of the following authors. What were their chief contributions to their country's literature :—

Jonathan Swift ; Rabindra Nath Tagore ; Voltaire ; Goethe ; Homer ; Dante ; Kalidas and Emerson.

55. Jonathan Swift. Most important works of Jonathan Swift are : *Gulliver's Travels*, *The tale of a Tub* and the *Battle of the Books*.

He enriched literature by his brilliant and biting satires in the English language.

Rabindra Nath Tagore. Most important works of Tagore are ; *Gitanjali*, *Chitra*, *The Post Office*, *The Crescent Moon*, *Gora*, *Mashi*, *Hungry Stones*, *The King and The Dark Chamber* etc. etc. He has enriched Bengali Literature by his novles, his poems and his dramas.

Voltaire. One of the greatest of French philosophers and writers : He enriched French literature by his lampoons and powerful satire, especially against priesthood and national superstitions and spirit of intolerance. His most important works are : *Candide*, *Zadig*, *The Age of Louis XIV*, and his tragedy *Irene*.

Goethe. One of the greatest and most versatile poet of Germany. He enriched German literature by his great lyrics, dramas, as well as some fine novels all of which have had also a profound influence on European literature.

His greatest masterpiece is *Faust*, the greatest dramatic poem in German language. His other well known works are :—*Werther*, and *Wilhelm Meister*, both novels; the classical dramas *Iphigenie* and *Tasso* and the autobiography *Dichtung and wahrheit*.

Homer enriched the ancient Greek literature by his world famous epics, the *Odyssey* and the *Iliad*.

Dante enriched Italian literature by his great poem *The Divine Comedy* which has been translated into almost all major languages of the world. It is the greatest poem of the Middle Ages.

Kalidas, the greatest dramatist of Ancient India, enriched classical Sanskrit literature by some of the greatest dramas the world has known. Most important of these are :—*Shakuntla*, *Raghuvansam*, *Kumarsambhava*, *Meghduta*, *Ritusambhara*, *Vikram-ervasi*, *Malavikagnimitra* etc.

Ralph Waldo Emerson, is one of the greatest American poet and essayist. He has enriched his country's literature with a number of fine poems and Essays which are remarkable for the quality of their thought, their brilliancy and clear style.

Most well known of these are the following :—"Essays" "Representative Men," "The Conduct of Life," "Society and Solitude," "Letters and Social Aims."

Q. 56. Which of these occur in the "Arabian Nights." *Blue Beard*, *Aladin and the Wonderful Lamp*, *Sindbad the Sailor*, *Sleeping Beauty*, *Ali Baba and the Forty Thieves*, *Jack and the Beanstalk*.

56. *Alladin and the Wonderful Lamp* ; *Sindbad the Sailor* ; *Ali Baba and the Forty Thieves*.

Q. 57. Who said and in what play "Out of this nettle danger we pluck this flower, safety"? Falstaff, Henry V, Hotspur, John of Gaunt, Polonius, Merry Wives of Windsor, Richard II, Henry IV, Henry V, Hamlet.

57. Hotspur in Henry IV. Act II. Scene 3.

Q. 58. The dwarf country visited by Gulliver was called Lilliput. The Giant country was :—

Yahooland, Nod, Brobdingnag, Laputa, Shangri La, Van Diemens Land.

58. Brobdingnag.

Q. 59. Who wrote :—

(1) How to be a Good Communist (2) Gulistan (3) Pickwick Papers (4) Sohrab and Rustam (5) John Gilpin (6) Midshipman (7) Wuthering Heights (8) Life of Dr. Johnson (9) A pair of Blue Eyes (10) Vanity Fair (11) War and Peace (12) Essays of Elia (13) The Naked and the the dead (14) Lady Chatterly's Lover.

59. (1) How to be a good Communist by Liu Shaochi (2) Sheikh Saadi (3) Charles Dickens (4) Matthew Arnold (5) W. Cowper (6) Frederick Marryat (7) Emily Bronte (8) Boswell (9) Thomas Hardy (10) W. Makepiece Thackeray (11) C. Tolstoy (12) Charles Lamb (13) The Naked and the Dead by Norman Mailer (14) Lady Chatterly's Lover by D.A. Lawrence.

Q. 60. "Barkis is Willin" runs a famous quotation. What was he willing to do :—

Join the Pickwick club, Elope with Philemon, Marry Peggotty, Have a drink with Arthur Pendennis, Marry Long John Silver.

60. Marry Peggotty.

Q. 61. The Jews are called children of Israel. Israelis is geneally known as :—

Abraham, Jacob, Joseph, Methuselah, Moses, Noah.

61. Jacobs.

Q. 62. From what poet do these lines come :—

(a) Drink to me only thine eyes and I will pledge with mine (b) 'Tis better to have loved and lost than never to have loved at all (c) The bowspirit got mixed with the rudder sometimes (d) Where ignorance is bliss, 'tis folly to be wise (e) A little learning is a dangerous thing.

(f) Higher still and higher

From the earth thou springest

Like a cloud of fire

The blue deep thou wingest.

62. (a) Ben Jonson, (b) Tennyson (c) Lewis Carroll (d) Gray (e) Pope (f) Shelley.

Q. 63. Explain the meaning of:—

Black ball ; Black cap ; Black eye ; Black sheep ; Black book ; Black magic ; Black Maria.

63. *Black ball.* To reject in voting by putting a black ball into a ballot box.

Black cap. A bird, so called from its black crown (2) The full dress cap put on by English judges to pronounce sentence of death.

Black eye. An eye which in the iris is black—A point of beauty ; a discoloration around the eye due to blow or fall.

Black sheep. A disreputable member of a family or group.

Black book. An official book recording the names of persons deserving punishment.

Black magic. Magic by means of which evil spirits.

Black maria. A closely covered, usually black van in which prisoners are conveyed between the court and the prison.

Q. 64. Name some of the poets who have held the position of the poet Laureate in England.

64. Ben Jonson

Sir William Davenant

John Dryden

Thomas Shadwell

Nahum Tate

Nicholas Rowe

Laurence Eusden

Colley Cibber

William Whitehead

Thomas Warton

Henry Pye

Robert Southey

William Wordsworth

Alfred Lord Tennyson

Alfred Austin

Robert Bridges

John Masefield

Q. 65. What is meant when a person is compared to:—

(1) Rustam (2) Shylock (3) Falstaff (4) Othello (5) Hamlet
(6) Chanakya (7) Savitri (8) Cordellia.

65. A Rustam : A man of uncommon bodily prowess (2) A very mean person of a very grasping nature and low mentality; to whom money is the end all and be all of existence (3) A very jolly, though boastful companion who is always cutting jokes and making everybody merry (4) A credulous person whom you can easily hood-wink (5) A person given to too much hairsplitting than acting. (6) A very clever person like the proverbial fox (7) A very devoted and saintly lady who will make an ideal wife (8) A very affectionate and devoted child, but who does not make show of her affections.

Q. 66 Where roughly did their authors locate ?

(a) Gulliver's Lilliput (b) Brobdingnag (c) Robinson Crusoe's Isle (d) New Switzerland (Swiss Family Robinson).

66. (a) West Australia ("North-west of Van Diemens' Land" Tasmania) (b) Roughly Vancouver (c) Jaun Fernandez Isle (off the Chili coast), (d) Near New Guinea.

Q. 67. Name the authors of :—

(a) Well of Loneliness (b) Alice in Wonderland (c) Ancient Mariner (d) Anand Math (e) The Three Musketeers (f) Cloister and the Hearth (g) The Origin of Spices (h) Jane Eyre (i) Elegy in a country Churchyard (j) The Way of all Flesh (k) Left Wing Communism and Infinite Disorder (l) Ulysses.

67. (a) Well of Loneliness by Radcliffe Hall (b) Louis Carrol (c) Coleridge (d) Bankim Chander Chatterji (e) A. Dumas (f) Charles Reade (g) Charles Darwin (h) Charlotte Bronte (i) Gray (j) Samuel Butler (k) Left wing Communism etc. by Lenin (l) Ulysses by James Joyce.

Q. 58. The persons whose names are given below include Essayists novelists, historians, biographers, autobiographers, poets, generals, religious teachers, pioneers, explorers and political leaders. Arrange the names in the appropriate classes.

Duke of Marlborough, Addison, Sir Rabindra Nath Tagore, Homerer, Mahavira, Napoleon, Mac Arthur, Gladstone, Jawaharlal Nehru, Lenin, Baden Powell, Lincoln, Madme. Curie, Julius Caesar, Shackleton, Bose, Confucius, Wordsworth, Trevelyan, Gibbon, Isaiah, Garibaldi and Sarat Chandra Chattopadhyaya.

68. *Historians* : Trevelyan, Gibbon

Biographers : Boswell

Autobiographers : Jawaharlal Nehru.

Poets : Sir Rabindra Nath Tagore ; Wordsworth ; Homer ;

Generals : Duke of Marlborough ; Napoleon ; MacArthur ; Julius Caesar

Religious teachers : Mahavira ; Confucius ; Isaiah

Pioneers : Madame Curie, Baden Powell

Explorers : Shackleton

Novelist : Sarat Chandra Chattopadhyaya

Political leaders : Lenin ; Lincoln ; Garibaldi ; Gladstone ; Bose.

Essayist : Addison

Q. 69. Who wrote :—

(1) Ramayana (2) Jungle Book (3) Gita Govind (4) De Profundis (5) The Invisible Man (6) Of Human Bondage (7) Sons and Lovers (8) Jestling Pilate (9) A Man of Property (10) The Nigger of the Narcissus.

69. (1) Valmiki (2) Rudyard Kipling (3) Jayadeva (4) Oscar Wilde (5) H. G. Wells (6) W. Somerset Maugham (7) D. H. Lawrence (8) Aldous Huxley (9) John Galsworthy (10) Joseph Conrad.

Q. 70. Give the titles of the poems from which the following extracts have been taken, mentioning the names of their authors. Give one or two striking passages from each one of them you remember.

(i) There was a time when meadow, grove and stream,
The earth and every common sight,
To me did seem
Apparell'd in celestial light
The glory and the freshness of a dream.

(ii) Just for a handful of silver he left us
Just for a riband to stick in his coat
Found the one gift of which fortune bereft us,
Lost all the others she let us devote ;

(iii) O for a draught of vintage ! that hath been
Cool'd a long age in the deep-delved earth,
Tasting of Flora and the country green,
.....
O for a beaker full of the warm South
Full of the true, the blüshful Hippocréne.

(iv) When can their glory fade ?
O the wild charge they made !

All the world wonder'd
Honour the charge they made
Honour the Light Brigade
Noble six hundred !

70. (i) Ode on Intimations of Immortality from Recollections of Early Childhood by Wordsworth.

The following are a couple of passages from his poems :—

I wandered lonely as a cloud
That floats on high o'er vales and hills
When all at once I saw a crowd,
A host, of golden daffodils
Beside the lake, beneath the trees,
Fluttering and dancing in the breeze.

(The Daffodils)

Earth has not anything to show more fair
Dull would he be of soul who could pass by
A sight so touching in its majesty.

(Upon Westminster Bridge)

(ii) The Lost Leader by R. Browning.

The following are a couple of passages from his poems :—

Oh, to be in England now that April's there,
And whoever wakes in England sees, some morning
[unaware,
That the lowest boughs and the brushwood sheaf
Round the elm-tree bole are in tiny sheaf
While the Chaffinch sings on the orchard bough in
England—now.

(Home Thoughts From Abroad)

Fear death ?—to feel the fog in my throat,
The mist in my face,
When the snow begin and the blasts denote
I am nearing the place,
The power of the night, the press of the storm,
The post of the foe ;
Where he stands the Arch Fear in a visible form,
Yet the strong man must go :

(iii) Ode to a Nightingale by Keats.

The following are a couple of passages from his poems—

'O what can ail thee knight-at-arms,
Alone and palely loitering ?
The sedge has wither'd from the Lake
And no birds sing.

".....magic casements, opening on the foam
of perilous seas, in faery lands—*forlorn*".

(*Ode to a Nightingale.*)

(iv) Lord Tennyson. The Charge of The Light Brigade.

Following are a couple of passages from Tennyson's poems :—

Ring out wild bells, to the wild sky,
The flying cloud, the frosty night ;
The year is dying in the night ;
Ring out, wild bells, and let him die.

Break, break break,
At the foot thy crags, O Sea !
But the tender grace of a day that is dead
Will never come back to me.

Q. 71. State what you understand by :—

Cap and feather days ; a feather in one's cap ; if the cap fits, wear it ; cap and gown ; to bring a question on the carpet ; carpet knight ; brown study.

71. *Cap and feather days* mean the time of childhood ; *A feather in one's cap*. An achievement to be proud of ; *if the cap fits, wear it* : if the remark applies to you, apply it yourself ; *cap and gown* : it is the full academical costume of a university student or professor ; *to bring a question on the carpet* is to bring it up for consideration ; *A Carpet Knight* is one who has been dubbed a knight at court by favour. He has not won his spurs by military service in the field ; *Brown study* means absence of mind.

Q. 72. Tono-Bungay is the name of :—

A suburb of Shanghai, A novel by H. G. Wells, a new anti-toxin, A Spanish insurgent general.

72. A novel by H. G. Wells.

Q. 73. The "Great Lexicographer" was a name for Doctor :—

Johnston, Johnson, Jonson, Johnstone.

73. Johnson.

Q. 74. Which of these were (a) Characters in fiction (b) Characters in history.

Tom Brown, John Brown, Tom Jones, Sir Thomas Browne.

74. (a) Tom Brown, Tom Jones.

(b) John Brown, Sir Thomas Browne

Q. 75. With what people do you connect the :—

(a) Sagas (b) Iliad (c) Vedās (d) Aeneid (e) Book of the Dead (f) Talmud (g) The Koran (h) The Avastha (i) The Upanishads.

75. (a) Norwegians (b) Ancient Greeks. (c) Hindus (d) Romans (e) Ancient Egyptians (f) Jews (g) Arabs (h) The Persians (i) The Ancient Aryans.

Q. 76. The Aryan Language group is so called because it :—

Was studied by Bishop Arries, covers a certain area in Europe and Asia, originated in Eire, Derives from Iran (Persia).

76. Derives from Iran (Persia)

Q. 77. Who wrote the words of these songs, and hymns :—

(a) Auld Lang Syne (b) Drink to me only with thine eyes (c) Over the sea to Skye (d) Mistress mine, where art thou roaming (e) There is a lady sweet and kind (f) Onward Christian soldiers.

77. (a) Robert Burns (b) Ben Jonson (c) Robert Louis Stevenson (d) Shakespeare (e) Robert Herrick (f) Baring Gould.

Q. 78. The following are well known pairs of names. Fill in the missing one in each case.

(a).....and Juliet (b) Antony and.....(c) David and

78. (a) Romeo and Juliet (b) Antony and Cleopatra (c) David and Fair Bathsheba.

Q. 79. Who coined the phrases :—

(a) Music hath charms (b) The white Man's burden (b) None but the brave deserve the fair (d) All that glitters is not gold (e) where ignorance is bliss (f) There were giants in those days.

79. (a) Congreve (b) Kipling (c) Dryden (d) Shakespeare (e) Gray (f) The author of Genesis.

Q. 80. In one of these contexts the word martingale is correctly used :—

(a) Let us sing a martingale (b) Martingales nest in dry places (c) A martingale below the ship out of her course (d)

saddle, harness and martingale were put on the horses (e) All tolls, titles, and martingales were remitted (f) The Saxons drank, mead, sack and martingale.

Ans. A martingale is part of a bridle.

Q. 81. Who wrote the following books :—

(a) The adventures of Tom Sawyers (b) Moby Dick (c) The History of Mr. Polly (d) Treasure Island (e) Meghdut (f) Reghuvansh (g) Major Barbara (h) The Good Earth (i) Obyssy (j) The Great Illusion (k) The Waste Land (l) The Postman Always Knocks Twice (m) Foundation of Leninism.

Ans. (a) Mark Twain (b) H. Melville (c) H. G. Wells (d) Robert Stevenson (e) and (f) Kalidasa (g) G. B Shaw (h) Pearl Buck (i) Homer (j) Sir Norman Angell (k) Thomas Stearns Eliot (l) The Postman always knocks Twice is by James Cain (m) Foundations of Leninism is by Joseph Stalin.

Q. 82. Which of these wrote (a) All for Love (b) Love's Lost (c) Love for Love.

Ben Jonson, Bernard Shaw, Congreve, Dryden, Marlowe, Shakespeare.

Ans. (a) Dryden (b) Shakespeare (c) Congreve.

Q. 83. Name the famous detections created by the following authors.

Conan Doyle, Agatha Christie, Dorothy Sayers, S. S. Van Dine and J. Dickson Carr.

Ans. Conan Doyle created Sherlock Holmes ; A Christie created Hercule Poirot ; Dorothy Sayers created Lord Peter Wimsey ; Van Dine created Philo Vance ; Carr created Dr. Fell.

Q. 84. Name some well known books written in prison.

Ans. Pt. Jawaharlal's Discovery of India ; Bunyan's Pilgrim's Progress ; Oscar Wilde's De Profundis ; Sir Walter Raleigh's History of the World ; Hitler's Mein Kempf ; Dr. Rajender Prasad's *Atam Katha* in Hindi.

Q. 85. Who were :—

The Lady of the Lamp, The Lady of the Lake, The Lady of Shallot, The Dark Lady of the Sonnets, The Widow of Windsor, and Milady.

Ans. *The Lady of the Lamp* - Florence Nightingale who went about the hospital wards in the Crimean War, lamp in hand.

The Lady of the Lake—Title of a poem by Sir Walter Scott.

The Lady of Shalott—Title of a poem by Alfred Lord Tennyson.

The Dark Lady of the Sonnets—The inspiration behind many of the Sonnets of Shakespeare.

The Widow of Windsor—Queen Victoria.

Milady—A fatally attractive woman. A character in Duma's *Three Musketeers*.

Q. 86. What was the christian name of Madame Curie (b) Bernhardt (c) Duse (d) Mrs. Siddons (e) Madam Pompadour (f) Nelson's Lady Hamilton.

Ans. (a) Marie (b) Sarah (c) Eleanora (d) Sarah (e) Janne (f) Emma.

Q. 87. John Gilpin rode to :—

York, Aix (from Ghent), Rouse the farmers of New England, Dine at the Bell at Edmonton, The martyr's tomb at Canterbury.

Ans. Dine at the Bell at Edmonton.

Q. 88. Supply the lines preceding.

Than never to have loved at all. Are losing theirs and blaming it on you. The lowing herd winds slowly o'er the lea. Confound their politics. That is the question. That woke the priest all shaven and shura.

Ans. "Tis better to have loved and lost".

"If you can keep your head while all about you."

"The curfew tolls the knell of parting day,"

"Scatter our enemies and make them fall,"

"To be or not to be,"

"This is the cock that crowed in the moon."

Q. 89. Which of these were sons of Adam and Eve :—

Abel, Abraham, Cain, Enoch, Seth, Shem.

Ans. Cain, Able, Seth.

Q. 90. Who wrote the following :—

(a) Lamia (b) In Memoriam (c) Thoughts on the Present Discontent (d) Kadambri (e) Das Capital (f) Rajtarangini (g) The Virginians (h) Sons of Innocence (i) Alexander's Feast (j) Malati-Madhava (k) Six Characters in Search of an Author (l) Modern

Arms and Free Man (m) The Fear of Freedom (n) The End of Economic Man (o) Meghnad Vadha.

Ans. (a) Keats (b) Alfred Tennyson (c) Burke (d) Bana (e) Karl Marx (f) Kalhana (g) Thackeray (h) William Black (i) Dryden (j) Bhavabhuti (k) Luigi Pirandello (l) Modern Arms and Free Man is by Vaunevar Bush (m) The Fear of Freedom is by Eric Formin (n) The End of Economic Man is by Peter Ducker and (o) Meghnad Vadha is by Michael Madhusudan Dutt.

Q. 91. What are the following :

Golden Horde, Golden Rule, Golden Horn, Golden Gate, Golden Valley, Golden Treasury, Golden Wedding, Golden Age, Golden Fleece.

Ans. *Golden Gate*—Entrance to San Francisco harbour.

Golden Valley—Valley of river Don in England.

Golden Horn—Inlet of the Bosphorus.

Golden Rule—‘Whatever ye would that men should do to you, do ye even so to them’ (The Bible).

Golden Age—Age of perfect happiness.

Golden Fleece—The fleece that was sought by Jason.

Golden Treasury—An anthology by F. T. Palgrave.

Golden Wedding—Fiftieth anniversary of a wedding, husband and wife being both alive.

Golden Horde—Body of Tartars who invaded Europe in the 13th Century.

Q. 92. Are these following books novels, poems, dramas, fables of stories ? :—

Mudra-rakshasa, Hitopdesha, The Time Machine, Far from the Madding Crowd, Jai-Somnath, Tapobhumi, Pratap Pratigya, Sur Sagar, Jag Biti, Bibi Ki Talim, Meghnad Vadha.

Ans. *Novels*—The time Machine, Far From the Madding Crowd, Jai-Somnath, Tapobhumi.

Poems—Sur Sagar, Meghnad Vadha.

Darmas—Mudra-rakshasa ; Pratap Pratigya.

Fables—Hitop-desha.

Stories—Jagbiti, Bibi ki Talim.

Q. 93. Who wrote the following novels ?

1. The Shape of Things to come, 2. Time must have a stop, 3. Lord Jim, 4. The Rains came, 5. For whom the Bell Tolls, 6. Gone with the Wind, 7. The Presidential Agent, 8. Random Harvest, 9. The Coolie.

Ans. 1. H. G. Wells ; 2. Aldous Huxley ; 3. Joseph Conrad ; 4. Louis Bromfield ; 5. Ernest Hemingway ; 6. Margaret Mitchell ; 7. Upton Sinclair ; 8. James Hamilton ; 9. Mulk Raj Anand.

Q. 94. Who painted the following ?

The Last Supper, The Sistine Madonna, The Disasters of War ; The First Anatomy Lesson ; The Laughing Cavalier ; Nocturnes ; The Assumption ; The Last Judgment ; Guernica ; Adoration of the Magi.

Ans. *Last Supper* : Leonardo da Vinci ; *Sistine Madonna* : Raphael ; *Disasters of War* : Goya ; *Anatomy Lesson* : Rembrandt ; *Laughing Cavalier* : Franz Hals ; *Nocturnes* : Whistler ; *Assumption* : Titian ; *The Last Judgment* : Michelangelo ; *Guernica* : Picasso ; *Adoration of the Magi* : Fra Angelico.

Q. 95. For whom was *Adonais* a lament, and in memory of whom was *In Memoriam* written ?

Ans. Keats ; Arthur Hallam.

Q. 96. Who wrote The Seven Lamps of Architecture (b) The Seven Pillars of Wisdom (c) Cranford (d) Tales from Shakespeare (e) The Spectator (f) Kidnapped (g) The Star Spangled Banner (h) Mill on the Floss (i) Wisdom of China and India (j) Brothers Karamazov (k) Haji Baba (l) China's New Democracy (m) Forever Amber.

Ans. (a) Ruskin ; (b) T. E. Lawrence (c) Mrs. Gaskell (d) Charles Lamb (e) Addison (f) R. L. Stevenson (g) Francis Scott Key (American) (h) George Eliot (i) Lin Yutang (j) F. M. Dostoevsky (k) Haji Baba by Sir James Morier (l) China's New Democracy by Mao Tse Tung (m) For Ever Amber by Kathleen Winsor.

Q. 97. Supply the missing words in the following titles :

The.....Dorian Gray, The Bridge of....., Back to.....and name the authors.

Ans. The Picture of Dorian Gray by Oscar Wilde ; The Bridge of San Luis Rey by Thornton Wilder , Back to Methuselah by Barnard Shaw.

Q. 98. Who wrote : The Good Earth ? About which country was it written ? What actress made the cinema version famous ?

Ans. Pearl Buck ; about China ; Luisa Rainer.

Q. 99. Is it correct that :—

Oliver Goldsmith wrote "The Vicar of Bray", (b) The Virginians is by Thackeray, (c) That Bankam Chander Chatterji-put "Jana, Mana,

Gana, in the mouth of one of his characters in his book *Anand Math*.

Ans. (a) No. Goldsmith wrote, "The Vicar of Wakefield".
(b) Yes, Thackeray wrote "The Virginians" (c) It was Bandemattaram.

Q. 100. Which of these creatures occur in Kipling's 'Jungle Book'?

Rikki-Tikki-Tavi, Tanka the Otter, Sala the Salmon, Rin-tin-tin, Benjamin Bunny, The Python Kaa.

Ans. Rikki-Kikki-Tavi; The Python Kaa.

Q. 101. Who was the composer or writer of the :—

Eroica Symphony (b) London Symphony (c) Pathetic Symphony
(d) New World Symphony (e) Unfinished Symphony (f) Sea Symphony?

What were the names of the :—

(i) Three Fates (ii) Three Graces (iii) Three Musketeers

Ans. (a) (a) Beethoven (b) Haydn (c) Tchaikovsky; (d) Dvorak (e) Schubert (f) Vaughan Williams.

(b) (i) Clotho, Lachesis, Atropos (ii) Agalia, Euphrosyne, Thalia. (iii) Athos, Porthos, Arims.

Q. 102. Who slew the :—

(a) Hydra (b) Gorgon (c) Minotaur (d) Drag Fafner (e) Chimæra, (f) Jabber-wock.

(b) With which hero in fiction do you associate? :—

(i) Wendy (ii) Rosalind (iii) Isodide (iv) Amelia Sedley (v) Heloise (vi) Dido.

Ans (a) (a) Hercules (b) Perseus (c) Theseus (d) Siegfried (e) Bellerphone (f) Frabyous Boy.

(b) Patter Pan; Orlando; Trisrtam; Dobin, also George Osborn; Abelard, Aeneas.

Q. 103. What was the name of the :—

(a) Knight without fear and without reproach (b) Sun King (c) Morning Star of the Reformation (d) Knight of the woeful countenance (e) Scourge of God (f) Citizen King (g) The Light of Asia (h) Light of the World (i) The Wizard of Electricity (j) The Iron Chancellor (k) The Man of Destiny (l) The Man of Blood (m) Good Queen Bess (n) The Sage of Chelsea (o) The Bard of Statford-on-Avon.

(b) Rearrange in their chronological order :—

Milton, Tennyson, Byron, Chaucer, Swinburne, Johnson, Kipling, Burns.

Ans. (a). (a) Bayard (b) Louis XIV (c) John Wycliffe (d) Don Quixote (e) Jenghiz Khan (f) Louis Philippe. (g) The Buddha (h) Christ (i) Thomas A. Edison (j) Bismark (k) Napoleon Bonaparte (l) Charles I, so called by the Puritans (m) Queen Elizabeth (n) Carlyle (o) William Shakespeare.

(b) Chaucer (1340-1400), Johnson (1572-1637). Milton (1608-74), Burns (1759-96), Tennyson (1809-92), Swinburne (1837-1909), Kipling (1865-1936).

Q. 104. (a) Shakespeare talks of the primrose path of :—

Peace, Plenty, Love, Ignorance, Dalliance, Joy.

(b) Tennyson wrote *Idylls of the King*, the king being Alfred, Arthur, Robert Bruce, Charlemagne, Richard Coeur de Lion, Cymbeline.

(c) He nothing common did or mean upon that memorable scene. Who didn't and what was the scene ?

Ans. (a) Dalliance

(b) Arthur

(c) Charles I at his execution.

Q. 105. Where is the scene laid in :—

(a) "Midsummer Night's Dream" (b) Romeo and Juliet (c) Othello (d) As You Like It (e) Hamlet (f) King Lear.

(b) Which of these characters were created by Charles Dickens :—

Mr. Jingle, Mr. Bingley, Martin Tupper, Bill Sikes, Edna May Oliver, Long John Silver.

(c) Which of these really existed : Little Miss Muffit, Little Jack Horner ; Little Bo-Peep ; Little Red Ridding Hood, Mary (of the little lamb), Little Tommy Tucker.

Ans. (a) (a) Athens (b) Verona (one scene in Mantua), (c) Venice and Cyprus (d) The Ardennes. France (e) Denmark (f) Britain.

(b) Mr. Jingle in "Pickwick Papers" and Bill Sikes in "Oliver Twist."

(c) Little Jack Horner ; Mary (of the little lamb).

Q. 106. In which play or opera do these songs occur ?

(a) "The last rose of summer (b) With a hey and a ho and a

hay nony no (c) Here's to the maiden of bashful fifteen (d) "Scenes that are brightest" (e) "Take a pair of sparkling eyes".

(b) "The Wizard of the North" is :—

Sir James Barrie, Robert Burns, James I of England, Ramsay MacDonald, Robert Louis Stevenson, Sir Walter Scott.

(c) The words "Water, water everywhere, not a drop to drink" were first used by :—

St. Paul (in Acts of the Apostles) Robinson Crusoe (in Defoe's book), Coleridge, Jerome, K. Jerome, Francis Thompson, H.G. Wells.

Ans. (a) (a) Martha (b) As you like it (c) School for Scandal (d) Maritana (e) Gondoliers.

(b) Sir Walter Scott.

(c) Coleridge.

Q. 107. In what art is each of the following distinguished ? :—

(a) Kalidasa (b) Edmund Bruke (c) Munshi Prem Chand (d) Rabindra Nath Tagore (e) Beethoven (f) Christopher Wren (g) Tulsidas (h) Michael Madhusudan Dutt (i) Brueghel (j) Vermeer.

Ans. (a) Poet and dramatist (b) A great orator and pamphleteer. By modern conservatives he is regarded as the greatest of their political exponents. (c) A great Hindi novelist and story writer (d) Great Indian poet, novelist, educationist and patriot (e) composer (f) Architect (g) Poet and epic writer (h) Poet and Epic writer (i) Painter (j) Painter.

Q. 108. What are the following :—

(a) Bolero (b) Mazurka (c) Pantomine (d) Serenade (e) Ballet (f) Lampoon (g) An Ode (h) An elegy (i) Blank Verse (j) Allegory (k) Chamber music.

Ans. (a) Spanish national dance, also the air to which it is danced (b) A lively Polish round dance for four or eight couples. The term also refers to the music such as is played in these dances (c) This term implies a form of dramatic art in which the actions and moods are expressed silently by posturê, gesture, facial expression and other non-oral interpretative means (d) This term denotes a sentimental composition, written to be sung out of doors at night under a lady's window and in praise of a loved one. (e) A theatrical exhibition composed of dancing, posturing and pantomimic action (f) A scurrilous personal piece of satire, generally on some prominent individual (g) In the words of Prof. Gosse, the Ode is "any strain of enthusiastic and exalted lyric verse, directed

to a fixed purpose, and dealing progressively with one dignified theme". Examples of such odes are: Keat's Ode to autiging Night'ngale and Coleridge's Ode to France (h) A poem of mourning or lamentation (i) Unrimed lines of ten syllables each (j) The treatment of a subject in which the incidents or characters are presented through symbolism or personification. Bunyans' Pilgrim's Progress is an example of an allegory (k) chamber music : "Instrumental music designed for performance by a small orchestra in a moderate sized room. Originally it referred to music performed for a nobleman in his own home as distinguished from music in a church or theatre...Hydn, Mozart and Beethoven were outstanding composers of chamber music which is chiefly represented by a string quartet."

Q. 109. Who wrote :—

1. Raghu-Vansam ; 2. Uttara Rama-Charita ; 3. Anand Math ; 4. Shahnama ; 5. Rubbayat ; 6. Urdu-i-Maula ; 7. Bangi-i-Dara ; 8. Fasanae-Azad ; 9. Prithiraj Rasu ; 10. Godan ; 11. Crime and Punishment ; 12. Candide 13. Songs of Innoeence ; 14. Androcles and the Lion ; 15. The Virginians.

Ans. 1. Kalidasa ; 2. Tulsidas ; 3. Bankim Chander ; 4. Firdausi ; 5. Umar Khayam ; 6. Azad Ullah Ghalib ; 7. Dr. Sir Mohd. Iqbal ; 8. Rattan Nath Dhar ; 9. Chand Bardai ; 10. Munshi Prem Chand ; 11. F. M. Dostoievsky ; 12. Voltaire ; 13. Blake wrote songs of Innocence ; 14. Bernard Shaw—Androcles and the Lion ; 15. Thackeray whote the Virginians.

Q. 110. Name some of the most important women novelists of England from the eighteenth century to the Victorian Era, and their works.

Ans. Some of the most prominent women novelists of the Eighteenth century were the following :—

Fanny Burney : *Evelina*, *Diary* and *Celia*.

Jane Austin : *Pride and Prejudice*, *Northanger Abbey*, *Sense and Sensibility*, *Mansfield Park* and *Emma*.

Lady Mary Wortley Montagu : *Turkish Letters*.

Women novelists of the Victorian Era.

The Bronte Sisters

Charlotte Bronte : *Jane Eyre*.

Emily : *Wuthering Heights*.

Anne : *Agnes Grey*.

George Eliot : *Adam Bede*, *Mill on the Floss*, *Romola*, *Daniel Deronda*.

Present day writers :—

Oliver Schreiner (her story of *African Farm*). Mrs. Golding Bright ; Sarah Grand i.e. Mrs. Mannington Caffyne, Beatrice Harraden, Elizabeth Robins and Mrs. W. K. Clifford.

Q. 111. Name, giving the nationality of authors who have been awarded the Nobel Prize in Literature since 1950.

Ans. 1950 Bertrand Russel	of England
1951 Paer F. Lagerkrest	„ Sweden
1952 Francois Maurice	„ France
1953 Sir Winston Churchill	„ England
1954 Ernest Hemingway	„ U.S.A.
1955 Halidor Kolijan	„ Iceland
1956 Iran Rayman	„ Spain
1957 Albunt Camus	„ France
1958 Boris Pasternak	„ Russia

Q. 112. Following are some famous pen names. Give the names of the authors who assumed these pen names :—

(1) Joseph Conrad, (2) Maxim Gorky (3) Knickerbocker (4) Elia (5) Tom Brown (6) Boz (7) Arthur Pendennis (8) Mark Twain (9) Q (10) A. E.

If you remember some other pen names mention them.

Ans. Joseph Conrad : Theodor Josef Konrad Korzeniowski.

Maxim Gorky : Alexey Maximovich Peshkov

D. Knickerbocker : Washington Irving

Elia : Charles Lamb

Tom Brown : Thomas Hughes

Boz : Charles Dickens

Arthur Pendennis : William Makepiece Thackeray

Mark Twain : Samuel Langhorne Clemens

Q : Arthur Quillerouch

A. E. : George William Russel

Some other equally well known pen names are the following : George Eliot (Marian Evans), Anthony Hope (Sir Anthony Hope Hawkins).

Iconoclast : Charles Bradlaugh.

Vernon Lee : Violet Paget.

T. P. : T. P. O'Connor.

Saki : H. H. Munro.

Q. 113. Name some well known living writers in India, and any of their works you know.

Ans. Some prominent contemporary Hindi writers are the following :—

Bal Krishna Sharma "Navin" (Born 1904—1960) : A nationalist and revolutionary poet ; had also written love lyrics. *Kumkum* and *Viplav Gan*.

Bhagwaticharan Verma (Born 1903). An outstanding poet, novelist and short story writer. His novel *Chitralkha* (modelled on Anatole France's *Thais*) was filmed and met with success. *Manav* ; *Patan* ; *Tin-Varsh* ; *Do Banke* ; *Terhe Merhe Raste*.

Chatursen Shastri (Born 1891) : Novelist. Novels : *Hridaya ki Parakha* ; *Hridaya ki Pyas* ; *Amar Abhilasa vashali ki Nagar-vadhu*.

Harivansh Rai "Bachchan" (Born 1901) : A progressive poet ; inspired by Omar Khayam. *Tera-Hai* ; *Madhushala* ; *Madhubala* ; *Madhukalas ! Sandhyageet Harti aur angareye*.

Jainendra Kumar (Born 1905) : Novelist, short story writer, essayist and critic. Novels : *Sunita* ; *Parakh* ; *Tyagpatra* ; *Kalyani*.

Mahadevi Verma (Born 1905) : Famous mystical poetess. Works : *Neehar* ; *Rashm* ; *Nirja* ; *Sandhyagit*—all four published in one volume : *Yama* ; *Deepshikha*. She is known as the Mira of the modern age.

Maithilisanan Gupta (Born 1886) : A very popular nationalist and outstanding poet. Awarded the Mangala Prasad Prize by Hindi Sahitya Sammelan for his *Saket* ; also the recipient of an honorary D. Litt, of Agra University. Translated Omar Khayam and some Bengali poems. *Bharat-Bharati* ; *Swadesh Sangeet* ; *Panchawati* ; *Gurukul* ; *Meghnad-Badh* ; *Yashodra* ; *Virangna* ; *Dwapar* and several other volumes of verse.

Makhan Lal Chaturvedi (Born 1881) : A well known nationalist poet Works *Him Kiritini* ; *Him Tarangni* ; 'Balidan,' 'Sipahi' and 'Ek Pushp ki Chah' are very famous individual poems.

Mohan Lal Mehto (Born 1901) ; Poet, short story writer, and novelist. Works : *Ek Tara*, *Nirmalya* ; *Rekha* ; *Kalpalna* ; *Rajkan*.

Ramadhari Sinha, "Dinkar" (Born 1908) : A great nationalist poet of Bihar. *Himkar* ; *Kurukshetra* ; *Dwandwa Geet* ; *Rasawanti*, *Renuka* ; *Kalinga Vijay*.

Sachidanand Hirananda Watsyayn (Born 1811); Famous poet, and short story writer. Editor *Prateek*.

Sudarshan (Born 1896). Novelist, dramatist and short story writer; now engaged in movies. *Anjana*, a play; *Bhagwati* and *Pariwartan*, novels. *Galpa manjari*, *Bhagya Chakra*; *Panghat*.

Surya Kant Tripathi "Nirala" (Born 1896): An outstanding poet, novelist, short story writer and essayist. Poems : *Parimal* ; *Anamika* ; *Gitika* ; *Tulsidas* ; *Anima* ; *Bela* ; *Nai Patte*. Novels : *Alaka* ; *Apsara*. He has also translated many Bengali works.

Siyaramsaran Gupta (Born 1897): A famous poet, novelist and story writer. Works: *Nari*; *Mausi* ; *Punya parva*; *Bapu*; *Vishad*.

Uday Shankar (Born 1895) : A romantic poet and dramatist. Poems : *Takshashila* ; Plays : *Vikramditaya* ; *Bapu* ; *Bisad*.

Upendra Nath "Ashk". (Born 1910) : A progressive novelist, short story writer and dramatist. Works : *Nao-ratna* ; *Asrat-ki Fitrat* ; *Dasi* ; *Parajay* ; *Sitaron ke Khel* ; *Swarg ki Jhalak* ; *Girti Deewaren*.

Q. 114. Who said.

1. Some books are to be tasted, others to be swallowed, and some few to be chewed and digested.....

2. Annual income twenty pounds, annual expenditure nineteen, nineteen six, result happiness. Annual income twenty pounds, annual expenditure twenty pounds eight and six, result misery.

3. Patriotism is the last refuge of a scoundrel.

4. Whoever could make two ears of corn, or two blades of grass, to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together.

5. The government of the people, by the people, and for the people shall not perish from the earth.

6. If my theory of relativity is proven successful, Germany will claim me as a German and France will declare that I am a citizen of the World. Should my theory prove untrue, France will say that I am a German and Germany that I am a Jew.

7. I do not know what I may appear to the World, but to myself I seem to have been only like a boy playing on the seashore and diverting myself in now and then finding a smooth pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me.

8. Is not a patron, my Lord, one who looks with unconcern on a man struggling for life in the water, and when he has reached ground, encumbers him with help?

9. I impeach him in the name of the people of India, whose rights he has trodden under foot, whose country he has turned into a desert. Lastly, in the name of human nature itself, in the name of both sexes, in the name of every age, in the name of every rank, I impeach the common enemy and oppressor of all.

10. I am not yet so lost in lexicography as to forget that words are the daughters of the earth, and that things are the sons of heaven.

11. The battle of Waterloo was won on the playgrounds of Eton.

12. The Army marches on its stomach.

13. The noblest prospect that a Scotchman ever sees is the high road leading him to London.

14. Truth is the summit of being, Justice is the application of it to others.

15. We must all hang together, or we will sure'y all hang separately.

16. Magnanimity in politics is not seldom the greatest virtue. Empires and little minds go ill together.

17. A minority may be in the right, but a majority is always in the wrong.

18. Et tu Brute?

Ans. 1. Bacon in his *Essays Of studies*.

2. Micawber in *David Copperfield*.

3. This saying is attributed to Dr. Johnson in Boswell's *Life of Johnson*.

4. Swift in *Gulliver's Voyage to Brobdingnag*.

5. Abraham Lincoln : Gettysburg Address

6. Albert Einstien. Address at the Sorbonne.

7. Sir Issac Newton (quoted in Brewster's *Memoirs of Newton*)

8. Samuel Johnson : Letter to Lord Chesterfield.

9. Edmund Burke : Impeachment of Warren Hasting.
10. Samuel Johnson in his preface to his dictionary.
11. Duke of Wellington after the battle of Waterloo.
12. Napoleon.
13. Johnson.
14. Ralph Waldo Emerson.
15. Benjamin Franklin.
16. Edmund Burke.
17. Ibsen.
18. Julius Caesar to Brutus when the latter, whom he considered one of his trusted friends, also stabbed him along with other conspirators.

Q 115. Who wrote the following and in which poem ?

1. Wring out, wild bells to the wild sky,
The flying cloud, the frosty light :
The year is dying in the night,
Ring out, wild bells, and let him die.
Ring out the old, ring in the new,
Ring, happy bells, across the snow.
The year is going, let him go,
Ring out the false, ring in the true.
2. All the world's a stage.
And all the men and women merely players :
They have their exits and their entrances ;
And one man in his time plays many parts,
His act being seven ages.
3. O for a beaker full of the warm South,
Full of the true, the blushful Hippocrene,
With beaded bubbles winking at the brim,
And purple-stained mouth.
4. Age cannot wither her, nor custom stale
Her infinite variety. Other women cloy
The appetite they feed ; but she makes hungry
Where most she satisfies.
5. This goodly frame, the earth seems to me a sterile promontory ; this most excellent canopy, the air, look you, this brave o'er-hanging firmament, this majestical roof fretted with golden fire, why, it appears no other thing to me than a foul and pestilent congregation of vapours.
6. For all the drowsy syrups of the world
Shall never medicine thee to that sweet sleep
Which thou ow'dst yesterday

7. Scots, what hae, wi Wallace bled,
Scots, whom Bruce has often led ;
Welcome to your gory bed
Or to glorious victorie
8. Thou was not born for death, immoral Bird !
No hungry generation stread thee down ;
The voice I hear this passing night was heard
In ancient days by emperor and clown :
Perhaps the self same song that found a path
Through the sad heart of Ruth, when, sick for home
She stood in tears amid the alien corn ;
The same that oft-times hath charm'd magic
Casements, opening on the foam of perilous seas.
In faery land forlorn.
9. All are but parts of one stupendous Whole,
Whose body Nature is and God the soul,
10. Know then thyself, presume not God to scan ;
The proper study of mankind is Man
11. Take up the white Man's burden—
Send forth the best ye breed—
Go, bind your sons to exile.
To serve your captives' need;
To wait in heavy harness
On flattened folk and wild—
Your new caught, sullen people,
Half-devil and half-child.
12. Hope springs eternal in the human breast.
Man never is, but always to be blest.
13. What is history but a fable agreed upon ?
14. O, yet we trust that somehow good
Will be the final good of ill,
To pangs of nature, sins of will,
Defects of doubt, and taints of blood.
15. God doth not need.
Either man's work or his own gifts, who best
Bear his mild yoke, they serve him best, his state
is kingly. Thousands at his bidding speed
And post o'er land and ocean without rest ;
They also serve who only stand and wait.
16. When Adam dived and Eve span
Who was then the gentlemen ?
17. Fame is the spur that the clear spirit doth raise.
(That last infirmity of noble mind)
To scorn delights, and live laborious days

18. Fallen, fallen, fallen, fallen,
Fallen from his high-estate,
And welt'ring in his blood.
19. Stern Daughters of the Voice of God ;
O Duty ! if that name thou love,
Who art a light to guide, a rod
To check the err'ng, and reprove.
20. Of Man's first disobedience, and the fruit
Of that forbidden tree whose mortal taste
Brought death into the World, and all our woe,
With loss of Eden.
21. Uneasy lies the head that wears a crown
22. "While stands Coliseum, Rome shall stand ;
When falls the Coliseum, Rome shall fall ;
And when Rome falls—the world".
23. When I remember how my light is spent,
Ere half my day, in this dark world and wide,
and that one talent, which is death to hide,
Long'd with me useless, though my soul more bent
To serve therewith my Master, and present
My true account lest he, returning, chide.
24. A thing of beauty is a joy for ever ;
Its loveliness increases, it will never
25. "Beauty is truth, truth beauty"—that is all
Ye know on earth, and all ye need to know.
26. "Nobly, nobly Cape Saint Vincent to the North-
West d'ed away ;
Sunset ran, one glorious blood-red, reeking into
Cadiz Bay ;
Bluish mid the burning water, full in face Trafal-
gar lay ;
In the dimmest North-East distance, dawned
Gibraltar grane and grey ;
Here and here did England help me how can I
help England,—say,
Whose turns as I, this evening, turns to God to
praise and pray,
While Jove's planet rises yonder, silent over Africa."
27. Speak no more of his renown,
Lay your earthly fancies down,
And in the vast cathedral leave him,
God accept him, Christ receive him.

28. I love all beauteous things.
 I seek and adore them ;
 God hath no better praise,
 And man in his hasty days
 Is honoured for them
 I too will something make
 And joy in the making ;
 Altho' tomorrow it seem
 Like the empty words of a dream
 Remembered on walking.

- Ans. 1. Tennyson in *In Memoriam*
 2. Shakespeare „ *As you Like It*
 3. Keats „ *Ode to a Nightingale*
 4. Shakespeare „ *Antony and Cleopatra*
 5. Shakespeare „ *Hamlet*
 6. Shakespeare „ *Othello*
 7. Burns „ *Bruce at Bannockburn*
 8. Keats „ *Ode to a Nightingale*
 9. Pope „ *Essay on Man*
 10. Pope „ *Essay on Man*
 11. Rudyard Kipling „ *The White Man's Burden*
 12. Pope „ *Essay on Man*
 13. Napoleon Bonaparte
 14. Tennyson „ *In Memoriam*
 15. Milton „ *On his Blindness*
 16. John Ball „ *During Wat Tyler's Rebellion*
 17. Milton „ *Lycidas*
 18. Keats „ *Alexander's Feast*
 19. Wordsworth „ *Ode to Duty*
 20. Milton „ *Paradise Lost*
 21. Shakespeare „ *Henry IV*
 22. Byron „ *Childe Harold*
 23. Milton „ *On his Blindness*
 24. Keats „ *Endymion*
 25. Keats „ *Ode on a Grecian Urn*
 26. Browning „ *Home Thoughts from the Sea*
 27. Tennyson „ *Ode on the Death of the Duke of Wellington.*

28. Robert Bridges „ *All Beauteous Things*

Q. 116. What do you mean by the following :

<i>Magnum Opus.</i>	<i>Veni Vidi Vici.</i>
<i>Mutatis Mutandis.</i>	<i>Vox Populi, Vox Dei.</i>
<i>Notre Dame.</i>	<i>Ad hoc.</i>
<i>Locus Standi.</i>	<i>Noblesse oblige.</i>
<i>Persona non grata.</i>	<i>Vade mecum.</i>
<i>Bacchus.</i>	<i>Habeas Corpus petition.</i>
<i>Modus Vivendi.</i>	<i>A malafide order.</i>
<i>Au Revoir.</i>	<i>Obiter dictum.</i>
<i>Edition de luxe.</i>	<i>Writ of Mandamus.</i>
<i>Peccavi.</i>	<i>Ab initio.</i>

Ans. *Magnum opus*—A great work.*Mutatis Mutandis*—With necessary changes.*Notre Dame*—Our lady.*Locus Standi*—A place for standing : a right to interfere.*Persona non grata*—A person who is not acceptable to those to whom he is sent.*Bacchus*—The God of wine.*Modus Vivendi*—A way or mode of living ; an arrangement or compromise by means of which persons or parties differing greatly are enabled to get on together for a time.*Au Revoir*—Adieu until we meet again.*Edition de luxe*—A splendid and expensive edition of a book.*Peccavi*—I have sinned.*Veni Vidi Vici*—I came, I saw, I conquered.*Vox Populi. Vox Dei*—The voice of the people is the voice of God.*Ad hoc*—for this object.*Noblesse oblige*—rank imposes obligations.*Vade Mecum*—A constant companion.*Obiter Dictum*—Something said by the way, a cursory remark.*Writ of Mandamus*—A writ of command issued by a high court to a lower.*Ab initio*—from the beginning.*Habeas Corpus petition*—A petition to a court praying that a writ be sent to a jailor to produce the body of one detained in prison and to state the reason of such detention.*A mala fide order*—An order served upon one with bad intention.

Q. 117. Who wrote the following ? :—

1. The paths of glory lead but to the grave.
2. Frailty, thy name is woman.
3. Much it grieved my heart to think
What man has made of man.
4. Play up ! Play up ! and play the game !
5. For men may come and men may go,
But I go on for ever.

Ans. 1. Gray.

2. Hamlet in Shakespeare's Hamlet.

3. Wordsworth.

4. Sir Henry Newbolt.

5. Alfred Lord Tennyson.

Q. 118. Below are mentioned some well known characters in literature. Name their creators, the books in which you come across them, also what they stand for.

Example. Becky Sharp :—An unprincipled girl, though attractive, in *Vanity Fair* by Thackeray.

Sam Weller.

Sindbad.

Rosalind.

Shylock.

Dr. Primrose.

Polonius.

Uriah Heep.

Mrs. Gummidge.

Col. Dobbin.

Lady Chatterley.

Sir Bedivere.

Ali Baba.

Mephistophles.

Ans. Sam Weller : A typical, sharp witted, humorous Londoner in *The Pickwick Papers* by Charles Dickens.

Sindbad—A merchant of Bagdad who makes seven voyages and encounters numerous adventures, which he narrates to Hindbad in *The Arabian Night's Entertainments*.

Rosalind—The fair daughter of the banished Duke, as heroine in *As You Like It* by W. Shakespeare.

Shylock—A typical Jew—grasping and stone-hearted—in *The Merchant of Venice* by W. Shakespeare. Representative of his race, as was conceived by the Christians of the Middle Ages.

Dr. Primrose—A simple minded loveable and devout clergyman in *The Vicar of Wakefield* by Goldsmith.

Polonius. The shallow minded and talkative aged Chamberlain—his mouth always full of maxims—at the Court

Denmark in *Hamlet* by W. Shakespeare, He is typical of the pompous, sententious old man.

Uriah Heep—The malignant clerk in the office of Mr. Wickfield in *David Copperfield* by Dickens. He is representative of sneakish people, who show outward humility, but are most designing and malignant.

Mrs. Gummidge—The widow of Peggotty's patron, representative of a type always mourning and bewailing her lot, in *David Copperfield* by Dickens.

Col. Dobbin—A simple minded soldier and a gallant gentleman in *Vanity Fair* by W. M. Thackeray.

Lady Chatterley—A woman of passionate nature in *Lady Chatterley's Lover* by D. H. Lawrence.

Sir Bedivere—A knight of the round Table in *Morted' Arthur* by Alfred Lord Tennyson.

Ali Baba—The hero of the story of the Forty Thieves in *The Arabian Night's Entertainment*.

Mephistophles is a manufactured name of a devil or familiar spirit which first appears in the last medieval Faust legend. He is well known as the sneering, jeering, leering tempter in Goethe's *Faust*. He appears in Shakespeare's *Merry Wives* and in Marlow's *Faustus* as *Mephistophilis*.

Q. 119. What subjects are dealt with by the following :—

- | | |
|-------------------|------------------|
| (a) Pathology. | (e) Genetics. |
| (b) Anthropology. | (f) Entomology. |
| (c) Metaphysics. | (g) Philology. |
| (d) Hydropathy. | (h) Ornithology. |

Ans. (a) *Pathology* is the science which deals with the nature, causes and remedies of diseases.

(b) *Anthropology* deals with man, considered as a social animal. In its widest sense it treats of his relation to the brutes, his evolution, the different races etc.

(c) *Metaphysics*. The science which investigates the first principles of nature and thought.

(d) *Hydropathy*. The treatment of diseases by water.

(e) *Genetics*. Science dealing with that department of biology which deals with the transmission of hereditary characters and with the origin of variations in species and individuals.

(f) *Entomology*. The branch of Zoology which deals with the study of insect life.

(g) *Philology*. The science of languages, but is applied more particularly to the critical study of the literary remains of the past.

(h) *Ornithology*. The science and study of birds.

Q. 120. Who wrote the following ?

(a) *Biographia Literaria* (b) *Gone with the Wind* (c) *Confessions* (d) *The English Humorists of the Eighteenth Century* (e) *For whom The Bell Tolls* (f) *Diana of the Crossways* (g) *Heroes and Hero Worship* (h) *Travels with a Donkey* (i) *Brothers Karamanzov* (j) *All Quiet on The Western Front*.

Ans. (a) Samuel Taylor Coleridge (b) Margaret Mitchell (c) Jean Jacques Rousseau (d) William Mackepiece Thackeray (e) Ernest Hemingway (f) George Meredith (g) Thomas Carlyle (h) Robert Louis Stevenson (i) Fyodor Dostoyevsky (j) Eric Remarque.

Q. 121. State the nationality of the following persons and what they were famous for :—

(a) Thomas Gainsborough (b) Hayden (c) Schubert (d) Kepler (e) Durer (f) Brahms.

Ans. (a) Gainsborough was a famous English portrait and landscape painter (b) Hayden was a famous English historical painter (c) Schubert was an Austrain musical composer. His abiding fame rests on his songs infused by an intensity of poetic feeling (d) Kepler was a German astronomer famous for establishing what are known as Keplers' Laws i, e. the three well known laws of the planetary motions (e) Durer was a German painter and engraver famous for his drawings and engravings which are regarded as some of the finest in the world (f) Brahms was a German composer famous as a performer as well as a composer.

Q. 122. What do the following books deal with ? :—

(a) *Arms and the Man*.
 (b) *The Last days of Pompeii*.
 (c) *The Moon and six pence*.
 (d) *Pilgrim's Progress*.
 (e) *The Time Machine*.
 (f) *Farewell to Arms*.
 (g) *Fathers and Sons*.

Ans. (a) It is a popular drama by George Bernard Shaw satirizing romantic notions of love and war.

(b) It is an historical novel by Bulwar Lytton dealing with the love of two young Greeks against the background

of the destruction of Pompeii in a volcanic eruption in A.D. 79.

(c) It is a novel by Somerset Maugham, dealing with a painter Charles Strickland, who sacrifices everything, including his family, for the sake of Art.

(d) An allegory by John Bunyan, relating the journey of its hero, Christian, to the Eternal City.

(e) It is a scientific Romance by H. G. Wells.

(f) It is a novel of the Post World War I period by Ernest Hemingway narrating an American's experience of War and Love as a Red Cross Officer with the Italian army on the Alpine.

(g) It is a novel by J. S. Turgenev about the old and new forces at work in modern society. The hero is a social iconoclast.

Q. 123. State which of the following are novels, plays, poems, or stories.

The Blessed Damozel, Ayesha, Jude the Obscure, L' Allegro, Arabian Night's Entertainments, Forsyte Saga, The Constant Nymph, How They Brought The Good News From Ghent, Caesar and Cleopatra, The Idiot, Andromache, Christabel, The Winter's Tales, A Pair of Blue Eyes.

Ans. Novels : Ayesha, Jude the Obscure, Forsyte Saga. The Constant Nymph, The Idiot, A Pair of Blue Eyes.

Poems : The Blessed Damozel, L' Allegro, How They Brought The Good News From Ghent, Christabel.

Stories : Arabian Nights Entertainments.

Dramas : Caesar and Cleopatra, Andromache, The Winter's Tales.

Q. 124. Name the most important novels by each of the following ? :—

Cervantes Sterne. Goldsmith, Emily Bronte, Dr. Johnson, Dostoyevsky, Maxim Gorky, Tolstoy, Thomas Hardy, George Meredith, and Robert Louis Stevenson.

Ans. Cervantes : *Don Quixto*

Sterne : *Tristram Shandy*

Goldsmith : *The Vicar of Wakefield*

Emily Bronte : *Wuthering Heights*

Dr. Johnson : *Rasselas*

Fyodor Dostoyevsky : *Crime and Punishment ; The Brothers Karamanzov*

Maxim Gorky : *Mother*

Count Leo Tolstoy : *War and Peace. Anna Karenina.*

Thomas Hardy : *Mayor of Casterbridge, Jude The Obscure, Pair of Blue Eyes, Far From the Madding Crowd and Tess of the D' Urbervilles.*

George Meredith : *The Ordeal of Richard Feverel ; The Egoist, Diana of the Cross-ways.*

Robert Louis Stevenson : *Treasure Island, Kidnapped.*

Q. 125. Who wrote the following poems :—

Alexander's Feast, Belle Dame Sans Merci, Absolom and Achitophel, The Dunciad, The Deserted Village, The Rape of the Lock, Venus and Adonias, Child Harold's Pilgrimage ; The Coming of Arthur : Lycidas, The Shepherd's Calendar, The Task, Epithalmion, The Earthly Paradise, Comus, The Hind and The Panther ; Il Penseroso ; The Lotus Eaters ; She Stoops to Conquer and Hyperion.

Ans. John Dryden wrote '*Hind and the Panther*', also '*Alexander's Feast*' and '*Absolom and Achitophel*' ; John Keats '*Belle Dame Sans Merci*' and '*Hyperion*' ; Pope '*The Dunciad*' and '*The Rape of The Lock*' ; Goldsmith '*The Deserted Village*' and '*She Stoops to Conquer*' ; Shakespeare '*Venus and Adonis*' ; Byron '*Child Harold's Pilgrimage*' ; Tennyson '*The Coming of Arthur*' and '*The Lotus Eaters*' ; Milton '*Lycidas*', '*Comus*' and '*Il Penseroso*' ; Spenser '*The Shepherd's Calendar*' and '*Epithalmion*' ; Cowper '*The Task*' and William Morris '*The Earthly Paradise*' ?

Q. 126. Where do these lines come from ?

✓(a) Man is born free, and everywhere he is in chains.

(b) The proletarians have nothing to lose but their chains.

(c) We hold these truths to be self evident, that all men are created equal, that they are endowed by their Creator with certain unalienable rights, that among these are life, liberty and the pursuit of happiness.

(d) WE THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN DEMOCRATIC REPUBLIC and to secure to all its citizens :

Justice, social, economic and political ; Liberty of thought, expression, belief, faith and worship.

Equality of status and of opportunity.....

do hereby.

✓(e) Religion is the opium of the people.

✓(f) O God deliver me from my friends ; I will take care of my enemies myself.

(g) I would sooner see England free than England sober.

✓(h) We must educate our masters.

(i) "Many politicians lay it down as a self-evident proposition, that no people ought to be free till they are fit to use their freedom—the maxim is worthy of the fool in the old story, who resolved not to go into the water till he had learned to swim."

Ans. ✓(a) *The Social Contract* by Rousseau.

(b) *The Communist Manifesto* by Marx and Engels.

(c) The American Declaration of Independence.

(d) The Preamble to the Indian Constitution.

(e) By Karl Marx. Introduction to critique of.....Hegel.

(f) By Voltaire.

(g) By Bishop Magee over the proposal to limit the hours of opening for public houses.

(h) By Robert Lowe in 1867 when the uneducated working men had been given the vote.

(i) Lord Babington Macaulay.

Q. 127. Where do you come across the following lines? By whom were they spoken?

(a) Blow, blow, thou winter wind

Thou art not so unkind

As man's ingratitude ;

Thy tooth is not so keen

Because thou art not seen

Although thy breath be rude.

(b) Thou wretched, rash, intruding fool, farewell !

(c) The quality of mercy is not strain'd

It droppeth as the gentle rain from heaven

Upon the place beneath ; it is twice blest ;

It blesseth him that gives and him that takes.

(d) Thou art the ruins of the noblest man

That ever lived in the tide of times.

(e) He was a man, take him for all in all.

I shall not look upon his like again.

Ans. (a) In Shakespeare's 'As You Like It'. It is a song by Amiens.

(b) In Shakespeare's 'Hamlet'. Spoken by Hamlet when inadvertently killing Polonius.

(c) By Portia in 'The Merchant of Venice'.

(d) By Mark Antony in Shakespeare's Julius Caesar'.

(e) By Hamlet in Shakespeare's 'Hamlet', while speaking about his father.

Q. 128. Explain what you mean by the following phrases :—

A Don Quixote ; to heap coals of fire on one's head ; Alexander's Beard ; A bag of bones ; Basic English ; To bell the cat ; To bear the bell ; Bench & Bar ; To be raised to the bench ; to talk Bellingsgate ; a bird of passage ; black and blue ; black swan ; blow the gaff ; a man of remnants ; a man of wax ; to sing the Magnificat at Matins ; three acres and a cow ; Adam's Apple ; Adoni's Garden and to get one's back up.

Ans. A Don Quixote : A dreamy unpractical, but essentially a good man.

Heap coals of fire on one's head : To melt down one's animosity by deeds of kindness ; to repay ill-treatment with good.

Alexander's Beard : A smooth chin, or very small beard.

A bag of bones : One who is very emaciated.

Basic English : A simplified system of learning English from a selected vocabulary of 850 most essential words, set up by C.K.Ogden.

To bell the cat : To encounter great personal hazard for the sake of others.

To bear the bell : To carry off the palm ; to be best.

Bench and bar : Judges and barristers.

To be raised to the bench : To be made a Judge.

To talk Billingsgate : To use foul, abusive language.

A bird of passage : A casual visitor ; a person who shifts from place to place.

Black and blue : Bruised.

Black swan : A very rare thing.

Blow the gaff : To let out a secret.

A man of remnants : A Tailor.

A man of wax : A model man like one fashioned in wax.

To sing the magnificat at matins : To do things at the wrong time or out of place.

Three acres and a cow : A small plot for gardening or farming.

Adam's apple : A protuberance in the forepart of the throat. This phrase has come from the superstitious belief that a piece of the forbidden fruit stuck in Adam's throat.

Adonis' Garden : A worthless toy ; a very perishable good.

Get ones' back up : To be irritated.

Laid on one's back : Laid up with chronic ill health.

Throw one on his back : To completely worst a man.

Q. 129. Who are the authors of the following books :—

1. The Dynasts 2. Testament of Beauty 3. Pygmalion 4. John Halifax Gentleman 5. The Story of Dr. Do Little 6. Coral Island 7. Hereward the Wake 8. Pamela 9. Rubaiyat of Umar-khayyam 10. Aeropagitica 11. Apologia pro vita sua 12. The School for Scandal 13. Post office 14. Mr. President 15. Passionate Elopement.

Ans. *The Dynasts* By Thomas Hardy ; *The Testament of Beauty* by Robert Bridges ; *Pygmalion* by George Bernard Shaw ; *John Halifax Gentleman* by Maria Craik ; *The story of Dr. Dolittle* by Hugh Lofting ; *Coral Island* by R M. Ballantyne ; *Hereward the Wake* by Charles Kingsley ; *Pamela* by Richardson ; *Rubayat of Umar-khayyam* by Edwards Fitzgerald ; *Aeropagitica* by John Milton ; *Apologia pro vita sua* by John Henry Newman ; *the School for Scandal* by Richard Brinsley Sheridan, *The Post office* by Tagore ; *President* by Mr. William Hillman and *Passionate Elopement* by Compton Mackenzie.

Q. 130. What is the meaning of :—

ad valorem ; *ad interim* ; *sine die* ; *nem con*, *alma mater* ; *en route*, *Faux pas*, *imperium in imperio* ; *persona grata*, *summum bonum* ; *Viva voce* ; *prima facie* ; *ipso facto*.

Ans. *Ad valorem*—According to (its) value.

Ad Interim—For the time being.

Sine die—Indefinitely ; without a day assigned ; without a day named.

Nem con—Without opposition, no one speaking in opposition.

Alma Mater—Benign mother. This affectionate term is applied to their University by its old students.

en route—on the way.

Faux pas—A false step ; a mistake.

Imperium in imperio—Rule within rule.

persona grata—An acceptable person.

Summum bonum—The highest good.

Viva voce—By the living voice ; by oral testimony.

Prima Facie—At first sight ; judging by first impressions.

ipso facto—By that very fact ; automatically.

Q. 131. The following list contains names of books and authors. Put down the names of the books against their respective authors.

Henry Fielding, *The Last of the Barons*; Tom Jones, John Henry Newman; *The Heart of Midlothian*, *Journal to Stella*; Sir James Mathew Barrie, *The History of The Second World War*, Rabindranath Tagore; *Murder in the Cathedral*; Aldous Huxley; Winston Churchill, Jonathan Swift, *Bulwar Lytton*, *The Idea of a University*, Sir Walter Scott, *The boy who did not grow up*, Thomas Stearns Eliot, *Sacrifice*.

- | | |
|-----------|-------|
| (a) | |
| (b) | |
| (c) | |
| (d) | |
| (e) | |
| (f) | |

Ans.	Books	Authors
	Tom Jones	... Henry Fielding
	<i>The Last of The Barons</i>	... Bulwar Lytton
	<i>The Heart of Midlothian</i>	... Sir Walter Scott
	<i>Journal to Stella</i>	... Jonathan Swift
	<i>The History of the Second World War</i>	... Winston Churchill
	<i>Murder in the Cathedral</i>	... Thomas Stearns Eliot
	<i>The Idea of a University</i>	... John Henry Newman
	<i>The Boy who did not grow up</i>	... Sir James Mathews Barrie
	<i>Sacrifice</i>	... Rabindra Nath Tagore

Q. 132. State what you understand by the following terms :—
cap and feather days; a feather in one's cap, if the cap fits, wear it; cap and gown, to bring a question on the carpet.

Ans. Cap and feather days mean the time of one's childhood; a feather in one's cap means an achievement to be proud of; if the cap fits, wear it. The phrase means that if a remark applies to you, apply it yourself; Cap and gown. The full academic costume of a university student; To bring a question on the carpet: To bring a question up for consideration.

Q. 133. Name some of the world's greatest sculptors and painters, both ancient and modern.

Ans. Sculptors.

Ancient : Phidias, Praxiteles and Scopas.

The Renaissance period : Donatello, Verrocchio, Della Robbia and Michelangelo.

Neo-Classic : Canova, Thorwaldsen and Flaxman.

Modern : Rodin, Epstein, Reid Dick, Dobson, Gill and Henry Moore.

Painters.

Painters of historical themes : Ingres, Delacroix, and David.

Landscape Painters : Turner, Constable, Claud Lorrain, Corot and Cotman.

Portrait Painters : Rembrandt, Goya, Velasquez, Sir Joshua Reynolds, Gainsborough, and Van Dyck.

Still Life : Jan and Cornelius Van Heem, Courbet, Manet, Braque etc.

Abstract : Picasso, Nicholson, Klee, Ernst etc.

Q. 134. Where and in what period did the following live and what is their title to fame ?

(a) Kalidasa

(h) Demosthenes

(b) Tulsidas

(i) Cicero

(c) Alighieri Dante

(j) Marcus Aurelius

(d) Plato

(k) Botticelli

(e) Hafiz

(l) Holbein

(g) Milton

Ans. (a) Kalidasa : The greatest epic poet of India lived between 300 to 450 A. D. He ranks among the foremost poets of the world. His fame rests on his following immortal works :—

Raghu-vansam ; Meghduta, Ritumsahara, Kumar Sambhava, Malavi Kagnimitra and the most famous of them all : Shakuntla. They are all great books.

(b) Tulsidas is the greatest and most representative of the Hindi Poets. He lived in U. P. between 1532-1623. His works on which his fame rests are :—

Ram Charita Manas, Krishna Gitavli, Kavitavli, Parvati Mangal etc.

(c) Alighieri Dante. The greatest poet of the Renaissance, and one of the greatest poets of Italy, "the voice of ten silent centuries". His fame rests on his great poem : Divine Comedy, which is the greatest poem of the Middle Ages. He lived between 1265-1321.

(e) Plato. One of the greatest of the ancient Greek philosophers who flourished between 427-327 B. C. His fame rests on his idealist philosophy which he expounded in a series of dialogues of which the principal are 'The Republic', 'Symposium', 'Phaedo' etc.

(e) Hafiz. Hafiz is among the greatest of Persian poets. He flourished between 1300-88 A. D. His fame rests on his *Diwan*, a collection of short odes, some extolling the pleasures of life, others satirising his fellow Derveshes.

(f) Goethe. Goethe is the greatest poet of Germany and one among the few greatest of the world. His fame rests on his great masterpiece *Faust*—a great dramatic poem in two parts. He lived between 1749-1832.

(g) Milton. Milton, the second greatest poet of England after Shakespeare lived between 1608-1674. His fame rests on his immortal *Paradise Lost*.

(h) Demosthenes. Demosthenes is regarded as not only the greatest of the Greek orators but also of antiquity. His fame rests on the orations he delivered to rouse his countrymen to the danger of the subjugation of Greece by Philip of Macedon. These are embodied in his immortal *Philippics*. He lived between 384-322 B.C.

(i) Cicero. After Demosthenes, Cicero is regarded as the greatest of the orators of the ancient world. His fame rests on his great speeches, first when he exposed and defeated the conspiracy of Catiline and next his 14 great speeches in which he supported Octavian (the future emperor Augustus) and denounced Mark Antony. These speeches are known as the *Philippics* (after the denunciation of King Philip of Macedon by Demosthenes) and are regarded as models of Latin prose. Lived 106-43 B. C.

(j) Marcus Aurelius. A Roman emperor who lived in the days of the early Christians from 121-180 A. D. and was a pagan. He is famous for his devotion to the Stoic Philosophy. He recorded his religious and moral principles in his world famous *Meditations*, which has won him ever-lasting fame.

(k) Botticelli was a celebrated painter of the Florentine school. His famous paintings are "Primavera". "The Birth of Venus", "The Magnificat", "The Annunciation" etc. He lived during the latter half of the 15th century (1447-1510) in Italy.

(l) Holbein who lived during the first half of the 16th century was a German portrait and historical painter and wood engraver. His portraits of Erasmus, Sir Thomas Moore, Anne of Cleves and Henry VIII are world famous. He is also best known for his series of woodcuts, like "The Dance of Death" etc.

Q. 135. What do the following books deal with :—

(a) The Canterbury Tales

- (b) *Child Harold's Pilgrimage*
- (c) *The Dunciad*
- (d) *The Faerie Queene*
- (e) *Morte D' Arthur*
- (f) *Don Quixote*
- (g) *The Pilgrims' Progress*
- (h) *She*
- (i) *Tess of The D' Urbervilles*
- (j) *War and Peace*

Ans. (a) *The Canterbury Tales* is a collection of 24 stories by Chaucer, all of which except two are in verse. These stories are supposed to be related by a company of 31 Pilgrims on their way to the shrine of St. Thomas at Canterbury. They give a vivid picture of contemporary social life.

(b) *Child Harold's pilgrimage* is a long narrative poem, describing the travels and reflections of a pilgrim (in fact, of Byron, the author) who, satiated and disgusted with a life of pleasure and revelry, seeks distractions in foreign lands—Portugal, Spain, Greece, Italy etc.

(c) *The Dunciad*. It is a satirical poem by Alexander Pope, directed against dullness in general, but the author directs his invectives against all the authors—under assumed names, of course—who had roused his wrath. They are all held up to ridicule for their dullness. The book may be described as the *Iliad* of the Dunces.

(d) *The Faerie Queene* is an allegory in verse founded on the manners and customs of Chivalry, with the aim of portraying a perfect knight, in the person of Prince Arthur of the Round Table fame, who goes out in search of the Fairie Queene. The Queene is Glory in the abstract and Queen Elizabeth is the living model in particular.

(e) *Morte D Arthur*—A poem by Tennyson; describes the passing away of King Arthur—a legendary hero of ancient Britain.

(f) *Don Quixote*. It is a romance (by Cervantes) satirizing the decadent romances of Chivalry, but not the essential Chivalric ideals. Its heroes are, Don Quixote, the mock knight—errant and his squire Sancho Panza.

(g) *The Pilgrim's Progress* is an allegory relating the journey of its hero, Christian, to the Eternal city. He flees from the city of Destruction, and passing the Slough of Despond, the Valley of Humiliation, the Valley of Shadow of Death, Vanity Fair, the Delectable Mountains, the House Beautiful and the country of Beulah reaches ultimately the City Beautiful.

(h) *She*. It is a tale about an Englishman going to Africa to avenge the death of an Egyptian ancestor, who has been murdered by a sorceress, known in the novel as 'She'.

(i) *Tess of the D'Urberville*. This novel depicts the tragedy of the woman of the world—the story of her fall and her battle with man to recover her purity of soul. Tess, the heroine, despite her physical defilement, is depicted as a pure woman.

(j) *War and Peace*. The book deals with the stirring conflict between Napoleon and France on the one hand and Koutouzaff and Russia on the other.

Q. 136. What were the four voyages made by Gulliver.

Ans. The first voyage was to Lilliput, the country of the dwarfs; the second to Brobdingnag, the country of the giants; the third to Laputa, the flying island, Lagado with its Academy of Projectors, and the land of the Struldbrugs or immortals; the last was to the country of the Houyhnhnms or reasoning horses, and the Yahoos or beasts in the shape of men.

✓**Q. 137.** What are the five languages in the world which are spoken by most people.

Ans. Languages most widely spoken are the following :—

1. Chinese by nearly 500 million people.
2. English by more than 270,000,000.
3. Indian Languages by about 400 million.
4. Russian and its dialects by 200 million.
5. Spanish by about 103 million.

Q. 138. Name ten famous books which you have read, stating who wrote them.

Ans. Ten famous books read by me are the following :—

1. *Alice Adventures in Wonderland* by Lewis Carroll.
2. *Battle of the Books* by Swift.
3. *David Copperfield* by Charles Dickens.
4. *Vanity Fair* by William Makepiece Thackeray.
5. *The Count of Monte Cristo* by Alexandre Dumas.
6. *Farewell to Arms* by Ernest Miller Hemingway.
7. *Adam Bede* by George Eliot.
8. *Far from the Madding Crowd* by Thomas Hardy.
9. *Ivanhoe* by Sir Walter Scott.
10. *Treasure Island* by Robert Louis Stevenson.

Q. 139. Give in about 80-100 words some account of any one of the books mentioned by you in the previous question noting the number of words used at the end of the question.

Ans. An account of *Far From the Madding Crowd* :

Bathsheba Everdene is courted by Gabriel Oak, bailiff of the farm she inherits, William Boldwood, a farmer in the neighbourhood, and Sergeant Troy, a handsome dashing soldier. Bathsheba marries Troy who squanders her money and illtreats her. Troy accidentally meets his old love Fanny and her child, who die the next day. The accident brings about a quarrel between Bathsheba and Troy and the latter departs to the sea but soon returns. Bathsheba believing him drowned becomes engaged to Boldwood. A fight ensues between Boldwood and the latter is killed. Boldwood gets life sentence and Bathsheba marries Oak.

100 words.

Q. 140. With what do you chiefly associate each of the following ?

(a) Herodotus (b) Plutarch (c) Aesop (d) Juvenal (e) Virgil (f) Dr. Samuel Johnson (g) John Bunyan (h) Linnaeus (i) Zoroaster (j) Justinian (k) Alexander Selkirk (l) Sir William Jones.

Ans. Herodotus—the writing of history (of Greece) ; Plutarch—*Biographies* ; Aesop—the Greek fables about animals ; Juvenal—satires on contemporary Roman society and on its vices ; Virgil—the great epic *Aeneid* ; Dr. Samuel Johnson. Bombastic writing and as the literary dictator of his day ; John Bunyan—the famous *Pilgrim's Progress* ; Linnaeus—as the founder of the system of classification of plants which bears his name ; Zoroaster—as the founder of the *Parsee* religion ; Justinian—The Codification and reform of the Roman laws ; Alexander Selkirk—the shipwrecked sailor on the island of Juan Fernandez whose experiences inspired Defoe to write his *Robinson Crusoe* ; Sir William Jones with the founding of the *Asiatic Society of Bengal*.

Q. 141. Who are the following ?

- | | |
|----------------------------------|--------------------------|
| (a) Hippocrates | (h) Ignaz Jan Paderewski |
| (b) Descartes | (i) Guy de Maupassant |
| (c) Sophocles | (j) Chekhov |
| (d) Leonardo Da Vinci | (k) Vermeer |
| (e) Michelangelo | (l) Hogarth |
| (f) Santi (or Sarzio)
Raphael | (m) Ingres |
| (g) Thucydides | |

Ans. (a) Hippocrates. Greek Physician, commonly styled, The Father of Medicine. Was a contemporary of Socrates and Plato. He set a high standard of professional ethics. The Hippocratic Oath has been taken by physicians for thousands of years. Lived about 460-377 B.C.

(b) Descartes. French Philosopher. Descartes is regarded as the father of modern philosophy and the founder of analytic and algebraic geometry. His philosophy is comprehended in two works : his *Discourses on Method*, and *Meditations*. Lived from 1596-1650.

(c) Sophocles. One of the greatest of Greek Tragic poets. The most important of his works that survive are : *Electra*, *Antigone*, *Ajax*, *Oedipus Tyrannus*, *Oedipus at Colonus* etc. He lived from 495-406 B.C.

(d) Leonardo da Vinci. He is regarded as the most universal genius the world has produced. "Poet, musician, scientist, engineer, philosopher, and mystic; he epitomises in a single individual the spirit and achievements of the entire Renaissance. His most well known masterpieces are his immortal pictures. *Mona Lisa*. The *Virgin of the Rocks*, The *Virgin with St. Anne*, and his tempera painting of the *Last Supper*." Lived 1452-1519.

(e) Michelangelo Buonarroti is among the greatest of Italian sculptors, painters and poets. He is the only artist of supreme excellence both as a painter and sculptor. His masterpiece in painting was the great series of biblical and classical studies with which he decorated the ceiling of the Sistine Chapel in Rome. His principal works of sculpture include the *Pieta*, *David*, the tomb of Pope Julius III, *Moses* and the *Slaves*. Lived 1475-1564.

(f) Santi (or Sanzo, Raphael). One of the greatest of Italian painters. His most notable paintings are :— "*St. Cecilia*," the "*Disputa*" "*School of Athena*" and "*Sistine Madonna*." He lived from 1483-1520.

(g) Thucydides. Greek historian who wrote the "*History of the Peloponnesian War*" in which he attempted a scientific and impartial history of his own time. Lived from 460-400 B.C.

(h) Ignaz Jan Paderewski. Polish pianist, composer and statesman. He became Polish Prime Minister in 1919. Died in 1941.

(i) Guy de Maupassant. French novelist and short story writer, dealing chiefly with Norman peasant life, the Franco-Prussian War, fashionable life in Paris etc. etc. His best known stories are : *The Necklace*, *En Famille*, *The Rendezvous*, and *The Umbrella*.

(j) Chekhov. "Russian dramatist, novelist and short story writer, known for the irony and pathos of his studies of frustrated middle-class lives in the Russian provinces and for his skilful and penetrating delineation of character. His best known play is *The Cherry Orchard*."

(k) Vermeer. Dutch artist. His paintings are distinguished by their harmonious colouring and technical excellence. His treatment of life is an outstanding characteristic.

(l) Hogarth. English painter, engraver, and caricaturist. He depicted the follies and vices of his age. Known for a series of pictures "*The Harlots' progress*", "*A Rake's Progress*". "*Marriage a La Monde*" etc. etc.

(m) Ingres. French historical painter. His pictures "*Joan of Arc*" and *La Source* are well known.

Q. 142. What were the following figures (in ancient mythology)?

Ceres, Apollo, Venus, Minerva, Mars, Vulcan, Diana, Bacchus, Pluto, Neptune, Sphinx, Prometheus, The Furies.

Ans.. Ceres was the daughter of Rhea and Saturn and was the goddess of agriculture ; Apollo, the son of Jupiter and Latons was the god of music and the arts, flocks and herds, prophecy, protection and punishment ; Venus was the goddess of love and beauty and the mother of Cupid, the god of love ; Minerva was the goddess of wisdom, war and the liberal arts. She was supposed to have sprung from the brain of Jupiter ; Mars was the god of war and was the offspring of Jupiter and Juno ; Vulcan, also the son of Jupiter and Juno, was the god of fire. It is said of him that being born lame, he was banished from mount Olympus, and became the blacksmith of the gods, for whom he forged armour and thunderbolts ; Diana was the goddess of hunt ; Bacchus, also known as Dionysus to the Greeks the son of Zeus and Semele, was the god of fertility of nature and especially of wine ; Pluto, also known as Hades was the god of the nether world—a gloomy sunless abode where the ghosts of the dead flit about like bats ; Neptune, the son of Saturn and Rhea was the god of the sea and of the horses ; Sphinx in Greek mythology was a monster generally represented with a woman's bust on a lion's body. Those who failed to answer correctly her riddle were either devoured or thrown into an abyss. It is said that king Creon of Thebes promised his crown and his sister Jocasta in marriage to whoever should solve the riddle. This was done by Oedipus, whereupon the Sphinx dashed her head against a rock and expired ; Prometheus was one of the Titans and a benefactor of mankind. He climbed the heavens and stole fire for men from the chariot of the sun. To avenge himself Zeus caused Prometheus to be bound to a rock while an eagle fed on his liver which was restored each succeeding night. Prometheus was delivered by Hercules ; The Furies

were three hideous winged women who pursued and punished guilty individuals.

Q. 143. What do you know of the following figures of ancient Greek mythology.

Achilles, Agamemnon, Atlas, Charybdis, Golden Fleece, Hercules, Jupiter, Pegasus.

Ans. Achilles is a great figure in Greek mythology. He is the bravest of the brave Greeks who fought in the Trojan War. During his infancy he was plunged by Theus in the Styx, thus making his body invulnerable, except if he was hurt in the heels. After many exploits he was wounded in the heel by Paris and died. The reader will call to mind a similar story of Karana in Ma-ha-bharat, whose body was to be similarly made invulnerable if he presented himself stark naked to his mother when she untied the cloth from her eyes. Karan was however persuaded to cover at least his groin, which he did and this was the vulnerable part through which the enemy's arrow bled him to death. Agamemnon was the king of Argos and the commander of the Greek host that went to Troy. After the fall of Troy he was murdered by his wife Clytemnestra and her paramour Aegisthus; Atlas in Greek mythology, was one of the Titans who was punished for his rebellion by having to support the sky. Perseus turned him into Mount Atlas which runs across the deserts of North Africa; Charybdis was a ravenous woman who was transformed into a whirlpool in the Strait of Messina; The Golden Fleece refers to the wool of the ram Chrysomallus, which was placed on a tree at Colchis and was guarded by a dragon. It was this Fleece which was won by Jason and the Argonauts; Hercules like Achilles is the model of strength and chivalry, the son of Zeus and Alcmene. Before he could claim his rights as his father's son he was doomed to a series of twelve dangerous adventures, which included the cleansing of the Augean stable, killing of the Lernean hydra etc.; Jupiter was the son of Rhea and Saturn. He vanquished the Titans and became king of heavens. He is also the chief of the gods of the Roman pantheon; Pegasus: A winged horse which sprang from the blood of Medusa. He was transformed into a constellation.

Q. 144. Who were the creators of the following characters? Also what do you know about them, and in which of their works have you come across them?

Sherlock Holmes, Sir John Falstaff, Mr. Pickwick, Shylock, Man Friday, Uriah Heap, Mrs. Malaprop, Mr. Micawber, Dr. Primrose, Sam Weller, Ariel, Mr. Burchell, Caliban, Cassim, Little Em'ly, Soames Forsyte, Sir Galahad, and Dr. Watson.

Ans. *Sherlock Holmes* is a private detective who figures in a number of works by Conan Doyle, notably 'The Adventures of Sherlock Holmes', 'The Memoirs of Sherlock Holmes' etc.; *Sir John Falstaff* is Shakespeare's creation in his drama *Henry IV*; *Mr. Pickwick* is the chief character in Dicken's novel, the "Pickwick Papers"; *Shylock* is the Jewish usurer in Shakespeare's *Merchant of Venice*; *Man Friday* is the Red Indian who makes a faithful companion and servant of the hero Robinson Crusoe in Daniel Defoe's novel of that name; *Uriah Heap* is a flattering knave in Dicken's *David Copperfield*; *Mrs. Malaprop* is a lady in Sheridan's comedy *The Rivals*, notorious for misusing words; hence the term "malapropism"; *Mr. Micawber* is a humorous character in Dicken's '*David Copperfield*' given to high flown language, fond of good living, extremely improvident, but generally optimistic and always waiting for 'something to turn up' *Dr. Primrose* is the vicar in Goldsmith's famous *Vicar of Wakefield*, good and simple man with amiable weaknesses and vanities; *Sam Weller* is a sharp witted humorous Londoner, servant of *Mr. Pickwick*, in the '*Pickwick*' Papers—one of the greatest creations of Charles Dickens; *Ariel* is an airy spirit liberated from bondage by Prospero, the Duke of Millan, in Shakespeare's *Tempest*; *Mr. Burchell* is the assumed name of Sir William Thornbill, a character in the *Vicar of Wakefield* by Goldsmith. This gentleman is suspected to be the seducer of Olivia, but ultimately marries Sophia; *Caliban* is a deformed and malignant being, servant of Prospero in Shakespeare's *Tempest*; *Cassim* is Ali Baba's brother in *The Arabian Night's Entertainment*; *Little Elm'y* is the niece of Peggotty engaged to Ham—a beautiful coquish girl, who elopes with the handsome Steerforth in Dicken's *David Copperfield*; *Soames Forsyte* is a lawyer—a man of very possessive and acquisitive instincts in *The Forsyte Saga* by Galzworthy; *Sir Galahad*, the famous creation of Tennyson in his *Idylls of the King* is a knight of the Round Table Conference, the chastest and noblest of all the company whose strength was "as the strength of ten, because his heart is pure" *Dr. Watson* is a slow witted medical practitioner who serves as a foil to the quick-witted *Sherlock Holmes* in *A Conan Doyle's Sherlock Holmes*.

Q. 145. Give the names of :—

- (a) The Three Lake Poets
- (b) Four great English woman novelists and atleast one work of each.
- (c) Four great French novelists and one work of each,
- (d) Three German Musicians.
- (e) Three great Spanish painters.
- (f) Three Italian sculptors.

Ans. (a) Lake Poets : Coleridge, Wordsworth, Southey.

(b) Women Novelists Jane Austin—work : "Pride and Prejudice" ; Charlotte Bronte—work : "Jane Eyre" ; George Eliot—work : "Adam Bede" ; Emily Bronte—work : "Wuthering Heights".

(c) French Novelists : Honore de Balzac—work : "Comedie Humaine" ; Alexandre Dumas, work : "The Three Musketeers" ; Anatole France, work : "Thais" ; Romain Rolland, work : "Jean-Christophe".

(d) German musicians 1. Johann Sebastian Bach 2. Richard Wagner 3. Ludwig Von Beethoven.

(e) Spanish Painters : 1. Don Diego Velazquez 2. Bartolomeo Murillo. 3. Pablo Picasso.

(f) Italian Sculptors : 1. Lorenzo Ghiberti. 2. Michelangelo Buonarroti. 3. Jacopo Della Quercia.

Q. 146. Put any five of the names in Group B against their creators in Group A :—

Group A

- (a) Chaplin
- (b) Beethoven
- (c) Sir Christopher Wren
- (d) Raphael
- (e) Leonardo da Vinci
- (f) Chopin
- (g) Nijinsky

Group B

- (a) Spectre of the Rose
- (b) St. Paul's Cathedral
- (c) The Last Supper
- (d) Funeral March
- (e) The Sistine Madonna
- (f) The Ninth Sympony
- (g) Monsieur Verdoux

Ans. *Group A*

- (a) Chaplin
- (b) Beethoven
- (c) Raphael
- (d) Sir Christopher Wren
- (e) Leonardo da Vinci

Group B

- (a) Monsieur Verdoux
- (b) The Ninth Symphony
- (c) The Sistine Madonna
- (d) St. Pauls' Cathedral
- (e) The Last Supper

Q. 147. Quote a short (not more than five lines) from each of the undermentioned poets, naming the work in which it is to be found :—

Milton, Shakespere, Longfellow, Wordsworth.

Ans. What is in me dark

 Illumine ; what is low, raise and support ;

 That to the height of this great argument

I may assert eternal Providence,

And justify the ways of God to men.

Ans. Milton in Paradise Lost.

Hath not a Jew eye ? hath not a Jew hands, organs...fed with the same food, hurt with the same weapons...If you prick us, do we not bleed ? If you tickle us do we not laugh ? If you poison us, do we not die ? and if you wrong us, shall we not revenge ?

Ans. Shakespeare in Merchant of Venice.

Tell me not in mournful numbers
Life is 'but an empty dream' ?—
For the soul is dead that slumbers,
And things are not what they seem.

Ans. Longfellow in a Psalm of Life

Thy soul was like a star, and dwelt apart,
Thou hadst a voice whose sound was like the sea
Pure as the naked heavens, majestic, free,
So didst thou travel on life's common way,
In cheerful goodliness ; and yet thy heart
The lowliest duties on herself did lay,

Ans. Wordsworth's Sonnet : London.
(addressed to Milton).

Q. 148. Against each meaning in the second column, put the number of the appropriate phrase in the first column.

Example : *Seriatum* : A gust of wind

- (2) *Casus belli* : Nothing beyond
- (3) *Pater Patriae* : The common spirit pervading the members
- (4) *ne plus ultra* : Something already done
- (5) *Fait accompli* : Let the buyer beware
- (6) *Mare clausum* : In regular order
- (7) *esprit de corps* : A closed sea
- (8) *in flagrante delicto* : The father of his country
- (9) *caveat emptor* : Whatever involves or justifies war
- (10) *Coup de vent* : In the very act of committing the crime

- | | |
|---------------------------------|---|
| Ans. (1) <i>Seriatum</i> | A gust of wind (10) |
| (2) <i>Casus belli</i> | Nothing beyond (4) |
| (3) <i>Pater Patriae</i> | The common spirit pervading the members (8) |
| (4) <i>Ne plus ultra</i> | Something already done (5) |
| (5) <i>Fait accompli</i> | Let the buyer beware (9) |
| (6) <i>Mare Clausm</i> | In regular order (1) |
| (7) <i>in flagrante delicto</i> | The father of his country (3) |
| (8) <i>Esprit de crops</i> | A closed sea (6) |
| (9) <i>Caveat emptor</i> | Whatever involves or justifies war (2) |
| (10) <i>Coup de vent</i> | In the very act of committing the crime (7) |

Q. 149. Give names and approximate dates of the poets or writers who wrote :—

(a) Our sweetest songs are those which tell of saddest thoughts

(b) The years' at the spring
And days' at the morn ;
Mornings' at seven ;
The hill-sides' dew-pearled ;
The larks' on the wing ;
The snails' on the thorn ;
God's in his heaven—
All's right with the world !

(c) Two things fill the mind with ever new and increasing wonder—the starry heavens above me and the moral law within me.

(d) To be, or not to be : that is the question :
Whether 'tis nobler in the mind to suffer
The slings and arrows of outrageous fortune,
Or to take against a sea of troubles,
And by opposing end them.

(e) To me the meanest flower that blows can give
Thoughts that do often lie too deep for tears.

(f) True wit is nature to advantage dressed,
What oft was thought, but ne'er so well expressed.

(g) Ill fares the land, to hastening ills a prey,
Where wealth accumulates, and men decay.

(h) I shot an arrow into the air,
It fell to earth I know not where ;

.....
I breathed a song into the air
.....
Long long afterward in an oak
I found the arrow still unbroke ;
And the song from beginning to end,
I found again in the heart of a friend

Ans. (a) Shelley (1792-1822) in *To a Skylark* (b) Robert Browning (1812-89) in *Pippa Passes* (c) Kant (1724-1804) in *Critique of Pure Reason*, (d) Shakespeare (1564-1616) in *Hamlet* (e) William Wordsworth (1770-1850) in *Intimations of Immortality* (f) Alexander Pope (1688-1744) in *Essay on Criticism* (g) Goldsmith (1728-74) in *The Deserted Village* (h) Longfellow (1807-82) in *The Arrow and the Song*.

Q. 150. In what plays of Shakespeare do the following characters appear? :—

Caliban, Oberon, Sir Toby Belch, Portia, Brutus, Ino, Anna Page, Falstaff, Goneril and Touchstone.

Ans. *Caliban*—*The Tempest* ; *Obéron*—*Midsummer's Night Dream* ; *Sir Toby Belch*—*Twelfth Night* ; *Portia*—*Merchant of Venice* ; *Brutus*—*Julius Caesar* ; *Iago*—*Othello* ; *Anne Page*—*Merry Wives of Windsor* ; *Falstaff*—*Henry IV*, also in the *Merry Wives of Windsor*, but except in name, the Falstaff of *Henry IV* presents a very different character in the other play ; *Goneril*—*King Lear* ; *Touchstone*—*As You Like It*.

Q. 151. Write in one sentence what you know of the following :—

Shylock, *Sam Weller*, *Sherlock Holmes*, *Long John Silver*, *Kipps*, *Kim*, *Snowwhite*, *Sir Falstaff*, *Iago*, *Ariel*, *Sir Toby Belch*, *Sir Bedivere*, *Bumble*, *Mrs Gamp*.

Ans. *Shylock*. The famous grasping, stony-hearted Jewish moneylender in Shakespeare's *Merchant of Venice*, who insists on his 'pound of flesh' to be cut from Antonio's body, for the latter's failure to repay in time his 3000 ducats.

Sam Weller. A sharp-witted humorous Londoner, servant of Mr. Pickwick, one of the great creations of Charles Dickens.

Sherlock Holmes. The famous detective who figures in a number of works of Conan Doyle and detects crime by using the method of deduction.

Long John Silver. A pirate, with one leg, in Stevenson's *Treasure Island*, who goes as a cook in Hispaniola in its adventurous expedition to find out the buried treasure in the *Treasure Island* and is the creator of so much trouble of its crew.

Kipps. In Well's novel of that name, a little vulgar, uneducated draper's assistant who unexpectedly inherits a big fortune which causes him so much trouble till he loses it and comes to his own.

Kim. An orphan boy of an Irish soldier, the hero of Kipling's novel of that name.

Snowwhite. A fairy in Grimm's world famous Fairy Tales.

Sir Falstaff. In Shakespeare's *Henry IV* 'a fat, witty, good-humoured old knight, loving jests, self indulgent, and over-addicted to sack'.

Iago. The notorious villain in Shakespeare's *Othello* who persuades Othello, of his wife Desdemona's unfaithfulness, and is the cause of the tragic death not only of Desdemona but also of the hero of the play.

Ariel. A spirit who obeys the commands of Prospero in Shakespeare's *Tempest*.

Sir Toby Belch. In 'Twelfth Night', 'a boistering knight, uncle to Olivia who plays on the folly of Sir Andrew Agnecheck.

Sir Bedivere. One of King Arthur's knights of the Round Table, the last who remained with him at his death and who threw his famous sword Excalibur into the lake.

Bumble. The celebrated pompous, self-important and tyrannical beadle in Dicken's *Oliver Twist*.

Mrs. Gamp. A large and talkative nurse in Dicken's *Martin Chuzzlewit*, given to drink and always carrying a big bagy umbrella.

Q. 152. Below are the opening lines of five famous poems ; state, in each case the name of the author and title of the poem.

- (i) Happy the Man, whose wish and care
A few paternal acres bound,
Content to breathe his native air
In his own ground
- (ii) O what can ail thee, knight-at-arms,
Alone and palely loitering ?
- (iii) My days among the Dead are past,
Around me I behold,
Where'er these casual eyes are cast,
The mighty minds of old :
- (iv) Hail to thee, blithe spirit !
Bird thou never wert ;
- (v) Verse, a breeze 'mid blossoms straying
Where Hope clung feeding, like a bee—
Both were mine. Life went a maying
With Nature, Hope and Poesy,
When I was young !

Ans. (i) Alexander Pope : "The Quiet Life".

(ii) John Keats : "La Belle Dame Sans Merci".

(iii) "The Scholar" : by Robert Southey.

(iv) Shelley : Ode to a Skylark".

(v) Samuel Taylor Coleridge : "Youth and Age".

Q. 153. Complete these common sayings

- A stitch in time—
A bad workman quarrels—
All work and no play—
The proof of the pudding—
There is a silver lining—
Birds of a feather—

Time and Tide wait—
 Take care of the pence and—
 Nothing venture—
 It is an ill wind that—
 Make hay while—
 Caesar's wife must be—
 Idleness is the—
 All that glitters—
 Cast not pearls before—
 Faint heart never won—
 Better today than—

Ans. A stich in time saves nine.
 A bad workman quarrels with his tools.
 All work and no play makes jack a dull boy.
 The proof of the pudding is in the eating.
 There is a silver lining to every cloud.
 Birds of a feather fly together.
 Time and tide wait for no man.
 Take care of the pence and the pounds will
 take care of themselves.
 Nothing venture nothing have.
 It is an ill wind that bloweth no man good.
 Make hay while the sun shines.
 Caesar's wife must be above suspicion.
 Idleness is the rust of the mind.
 All that glitters is not gold.
 Cast not pearls before swine.
 Faint heart never won fair lady.
 Better today than tomorrow.

Q. 154. What are Impressionism, Post-impressionism, Cubism, Futurism and Surrealism.?

Ans. *Impressionism* is the attempt, begun by French artists in the latter half of the nineteenth century, who rejected old artistic traditions and conventional methods, to portray their impressions of nature as exactly seen by them, rather than objective characteristics of things and events; *Post impressionism* is the attempt to express the inner structure, and not merely the surface; *Cubism* is the presentation of nature by a rectangular or geometrical treatment of forms; also with the aim at realizing, by a series of colours, the pictorial idea in the mind of the artist; *Futurism* represents nature in a state of movement; *Surrealism* is the deliberate distortion of the external world. It rejects the tyranny of harmony and good taste and aims at swiftness, pride, feverish activity and steely hardness. In striving to portray on canvass a

series of unconnected ideas, Surrealism tends to be abstract and symbolic.

Q. 155. (a) What is the meaning of atheism, agnosticism, deism?

(b) With what is each of the following classical (European) deities chiefly associated?

(i) Mars (ii) Neptune (iii) Diana (iv) Bacchus (v) Venus (vi) Apollo (vii) Cupid (viii) Nymphs (ix) Pan and (x) Vulcan

Ans. (a) *Agnosticism* is the doctrine which disclaims all knowledge of the supersensuous, and denies that we can ever know the absolute; the infinite or God, or the after life etc.; *Atheism* is the denial of the existence of God. *Deism* accepts on purely rational grounds, the existence of a being divine but denies that He has revealed Himself to mankind.

(b) *Mars* was the God of war; *Neptune* of the sea and of horses; *Diana* the goddess of hunt; *Bacchus* the god of wine; *Venus* the goddess of love and beauty; *Appollo* the god of music and the arts; *Cupid* god of love; *Nymphs* were female goddesses of nature; *Pan* was the god of shepherds, flocks and rural persons; *Vulcan* was the god of fire.

Q. 156. In which arts do or did the following excel. Name some of their best work?—

Edward Hopper, Henry Koerner, Henry Matisse, Pablo Picasso, Abindranath Tagore, Ashit Kumar Haldar, Nandlal Bose, Deviprasad Roy Choudhury, M.A. Rehman Chughtai and Somerset Maugham.

Ans. Edward Hopper, Henry Koerner, Henri Matisse and Pablo Picasso in painting; Abindranath Tagore, Ashit Kumar Haldar, Nandlal Bose, Deviprashad Choudhry and M. R. Rehman Chughtai are Indian painters.

Works. H. Koerner; *Vanity Fair*; A. Tagore: *Bharat-mata*, *Passing of Shahjahan*; Haldar: *Krishna's Dance*; Bose: *Karna*, *Garuda*; Roy: *Bhutia maid*; Chughtai; *The Poet*, *The Hermit*; Pablo Picasso: *Guernica*; Henri Matisse: *La Dance*.

Q. 157. In which famous works do you come across these characters?

The Mad Hatter; D'Artagnan; Mrs. Grundy; Pater Pan; Sancho Panza; Cristian; Pistol; Dr. Jekyll; Peggotty; Orlando; Desdemona; Rip Van Winkle; Shakuntla.

Ans. The Mad Hatter in *Alice in Wonderland* ; D' Artagnan in Duma's *The Three Musketeers* and *Twenty Years After* ; Mrs. Grundy in *Speed the Plough* ; Peter Pan in J M. Barrie's *Peter Pan*, Sancho Panza in Cervantes' romance *Don Quixote* ; Christian in Bunyan's *Pilgrim's Progress* ; Pistol in Shakespeare's *Merry Wives of Windsor* and *Henry IV* ; Dr. Jekyll in Stevenson's *Strange case of Dr. Jekyll and Mr. Hyde* ; Peggoty in Dicken's *David Copperfield* ; Orlando in Shakespeare's *As You Like It* ; Desdemona in Shakespeare's *Othello* ; Rip Van Winkle in Irvings' tale of the same name ; Shakuntla in Natak of the same name by Kalidasa.

Q. 158. From which famous author and from which of his works do these well known lines come :—

- (1) Paths of glory lead but to the grave.
- (2) Lord God of Hosts, be with us yet, lest we forget, lest...
- (3) There are more things in heaven Horatio than are dreamt of in your philosophy
- (4) All the Worlds' a stage
And all the men and women merely players
- (5) Reading maketh a full man ; conference
A ready man, and writing an exact man.
- (6) None but the brave deserve the fair
- (7) With malice towards none ; with charity for all ;
With firmness in the right ; as God gives us to see the right.
- (8) If winter comes' can spring be far off.
- (9) I expect that woman will be the last thing civilized by Man.
- (10) Poets are the unacknowledged legislators of the World.
- (11) They shall not grow old ; as we that are left grow old ; age shall not weary them, nor the years condemn.
- (12) Thou pendulum betwixt a smile and tear.
- (13) Oh Solitude ! where are thy charms.
That sages have seen in the face ?
- (14) Put your trust in God, my boys, and keep your powder dry.
- (15) If I should die, think only this of me :
That there's some corner of a foreign field
That is for ever England.

- (16) Fame is the spur that the clear spirit doth raise
(The last infirmity of noble minds)
To scorn delights, and live laborious days.
- (17) Slow rises worth by poverty depressed.
- (18) Give every man thine ear, but few thy voice ;
Take each man's censure, but reserve thy judgement.
- (19) "There's rosemary, that's for remembrance ; pray,
love, remember : and there is pansies, that's for
thoughts".
- (20) "Yond Cassius has a lean and hungry look ; he thinks
too much : such men are dangerous."
- (21) There is no indispensable man in a democracy.
When a republic comes to the point where a man is
indispensable then we have a Caesar. I do not believe
the future of a nation should depend on the life,
health or welfare of any one man."

Ans. (1) 'Elegy written in a Country Churchyard' by Thomas Gray (2) The 'Recessional' by Rudyard Kipling (3) Shakespeare's *Hamlet* (4) Shakespeare's 'As You Like It' (5) Francis Bacon in his *Essays of Studies* (6) Dryden in 'Alexander's Feast' (7) Abraham Lincoln in his 'Second Inaugural Address' (8) Percy Bysshe Shelley in 'Ode to the West Wind' (9) George Meredith's 'Ordeal of Richard Feverel' (10) P. B. Shelley in 'Defence of Poetry' (11) Laurence Binyon in 'For the Fallen' (12) Lord Byron in *Childe Harold, Canto III* (13) William Cowper in 'Lines by Alexandre Selkirk' (14) Oliver Cromwell (15) Rupert Brooke : 'The Soldier' (16) John Milton in 'Lycidas' (17) Dr. Johnson in 'London' (18 and 19) Shakespeare's 'Hamlet' (20) Shakespeare's Julius Caesar (21) Mr. President by William Hillman (Remark of Ex-President Truman quoted from his book).

Q. 159 Write short notes on the following Indian musicians and dancers :—

Ram Gopal ; Shreemati Santa ; Shreemati Menaka, Uday Shankar ; Shreemati Sadhna Bose and Bala Saraswati.

Ans. Ram Gopal. Famous dancer of South India, a disciple of the American dancer La Meri ; influenced by Hollywood dance fashions.

Shreemati Santa. A South Indian dancer, a disciple of the Malayali poet Vallathol of Kerala Kalamandiram.

Shreemati Menaka. A very widely travelled dancer, the leader of the first Indian ballet troupe.

Uday Shanker. World famous Indian dancer. Has widely travelled and given performances of his art in foreign countries. His famous partners are Simke, Amla Nandy, the second of whom he married sometime back. His film *Kalpna* is full of Indian dances and is considered to be one of the worlds' best pictures.

Shreemati Sadhna Bose. Famous stage and screen dancer.

Bala Saraswati. Student of Kerala Kalamandiram. Noted for the revival of *Bharat Natyam*.

Q. 160. (a) In which countries are the following papers printed? :—

Pravada, Dawn, Al Misri, Chieh Fang Jih Pao, Civil & Military Gazette, Asahi Shimbun, Acropolis, Izvestia, Globe, Al Ahram.

(b) In which countries are the following news services? :—

International News Service, Reuters, The Tass, Allied Information Service, Kyodo News Agency, The United Press and Associated Press.

(c) In which cities in India are the following dailies printed? :—

Amrit Bazar Patrika, The Leader, Deccan Herald, Times of India, New Orissa, Hitvada, Pioneer, Hindu, Punjab Times, Statesman and Star of India.

(d) In which languages are the following papers being printed? :—

Vishwamitra, Basumati, Bharat Devi, Lokmanya, Janambhumi, Vartman, Deshbandhu, Prajatantra, Prabhatam, Sansar Smachar.

(e) Name the Indian News Agencies.

Ans. (a) Pravda and Izvestia in the U. S. S. R., Dawn in Karachi; Civil and Military both in Lahore and Karachi, (West Pakistan); Al Misri and Al Ahram in Egypt; Chieh Fang Jih Pao in Shanghai; Asahi Shimbun in Tokyo, Osaka, Nagoya and Kyushu (Japan); Acropolis in Greece and Globe in Boston (U.S.A.).

(b) The News Services are in the following countries :

Reuters Ltd., and Associated Press in Great Britain; Associated Press, United Press and International News Service in U.S.A.; Kyodo News Agency in Japan; Tass in U.S.S.R.

(c) Following are the cities in which the following daily papers are printed :—

Amrita Bazar Patrika both in Calcutta and Allahabad; The Leader in Allahabad; Deccan Herald in Bangalore; Times of India both in Bombay and Delhi; Hitvada in Nagpur; Pioneer in

Lucknow ; Hindu in Madras ; Punjab Times in Amritsar ; Statesman in Calcutta and New Delhi ; Star of India in Calcutta.

(d) Vishwamitra in Hindi ; Basumati in Bengali ; Bharat Devi in Tamil ; Lokmanya in Marathi ; Janambhumi in Gujrati ; Vartman in Punjabi ; Prajatantra in Oriya ; Prabhatam in Malayalam ; Sansar Samachar in Sindhi.

(c) Indian News Agencies are :—

1. The United Press of India ; Press Trust of India.

Q. 161. Write in brief what the following books deal with, and also mention the author of each of them :—

Anna Karenina, *Ben Hur*, *The Count of Monte Cristo*, *Crime and Punishment* ; *Fathers and Sons* ; *The Jungle*, *Last days of Pompeii* ; *The Moon and Six Pence* ; *The Pilgrim's Progress* ; *The Return of the Native* ; *Uncle Tom's Cabin* ; *The Way of All Flesh* ; *In Place of Fear*.

Ans. *Anna Karenina* is a novel by Leo Tolstoy. Its theme—the simple one of the wife, the husband and her lover—is treated with a marvellous perception of the laws of morality and of passion. *Anna Karenina*, the heroine, a woman of noble birth, sensitive and passionate is the subject of a subtle psychological study. She is married to an old, vain, tiresome man, whom she abhors, and loves Count Vronski, a young officer. She struggles and surrenders, which leads to her suicide.

Ben Hur or *a Tale of The Christ*, is by Lew Wallace. It is a romantic description of the late Roman Empire and the rise of Christianity.

The Count of Monte Cristo is by Alexander Dumas. It is a novel that deals with the story of a man who has been falsely accused by his personal enemies for being a Bonaparte conspirator and remains imprisoned for a number of years, for which, after his escape, he devotes years to the pursuit of his revenge under various names.

Crime and Punishment. A Russian realistic novel by Dostoyevsky, being a subtle and powerful psychological study revolving about the murder of an old woman, a moneylender, and, her sister, by Raskolnikov, a student in St. Petersburg.

Fathers and Sons by J. S. Turgenev is a powerful novel about the conflicting old and new forces at work in modern society. The hero is a social iconoclast, named Bazarov.

The Jungle by Upton Sinclair, is an exposure of the horrible and revolting life and practices in the Chicago stockyard.

The Last Days of Pompeii. It is an historical novel by Bulwar Lytton, and deals with the love of two young Greeks against the

background of the destruction of Pompeii in a volcanic eruption in A. D. 79.

The Moon and Sixpence by Somerset Maugham, deals with a painter Charles Strickland who sacrifices everything including his family, for the sake of art.

The Pilgrim's Progress. It is an allegory written by John Bunyan, relating the journey of its hero, Christian to the Eternal city.

The Return of the Native. Novel by Thomas Hardy. It is a study in Fatalism with Eustacia Vye and Clym Yeobright as its heroine and hero, living their tragic lives against the background of Egdon Heath.

Uncle Tom's Cabin by Harriet Beecher Stowe is an anti-slavery novel presenting the sufferings of Negroes in the U.S.A.

The Way of All Flesh. A satirical novel by Samuel Butler, directed against Victorianism, particularly the tyranny of parents over children and the Anglican Church.

In Place of fear. A recent book (1952) by Aneurin Bevan British Labour Leader in which he analysis the causes of unrest throughout the world and the fear of the spread of Communism, which has so much alarmed the Western World, more specially the U. S. A., which sees in it a challenge to her way of life and the free institutions of which she is the champion. Mr. Bevan suggests the remedies which should be applied to meet the grave situation arising out of man's hunger and want than meeting the challenge by military preparation alone.

Q. 162. What types of books did the following authors write? Mention also the countries to which they belonged and the countries in which they lived.

Pliny the Elder, Ptolemy, Horace, Virgil, Leigh Hunt, Hazlitt, Humboldt, Edward Morgan Forster, Carlyle, Erasmus, Robert Southey, Montaigne, Robert Burton, Samuel Pepys, Charles Lamb, Juvenal, Thomas de Quincy, Ben Johnson and W. B. Yeats.

162. Pliny the Elder. Italian; lived in the first century A. D. Wrote histories, now lost. Also a "Natural History" dealing with astronomy, geography, zoology and minerology.

Ptolemy. Egyptian; lived in the 2nd century A. D. Wrote a book on geography.

Horace. Italian; lived in the 1st century B. C.; wrote odes and series of verse letters; also, satires on the follies of contemporary society.

- Virgil.** Italian ; lived in the 1st century B. C. Wrote pastoral poems and an epic poem.
- Leigh Hunt.** Englishman ; lived in the nineteenth century. Wrote narrative poetry and essays.
- Hazlitt.** Englishman ; lived during the nineteenth century. Wrote mostly essays and criticisms specially of his contemporaries.
- Humboldt.** German ; lived during the nineteenth century. Wrote books on travel and the physical sciences.
- E. M. Forster.** Englishman. He is a living novelist.
- Carlyle.** Scotchman ; lived during the nineteenth century. Wrote lives of some great men (e. g. Life of Schiller). histories (e. g. History of Frederick the Great), translations (e. g. Goethe's Wilhelm-Meister) etc.
- Erasmus.** Dutch ; lived between the fifteenth and sixteenth centuries. Famed for his Letters, of which more than 3,000 survive.
- Robert Southey.** Englishman ; lived during the nineteenth century. Wrote poems, letters and lives of great men (e. g. Life of Nelson).
- Montaigne.** French ; lived during the sixteenth century. Famed for his "Essays".
- Robert Burton.** Englishman ; lived during the seventeenth century. Wrote a compendium of medical and religious opinions of his time (Anatomy of Melancholy).
- Samuel Pepys.** Englishman ; lived during the seventeenth century. Great diarist.
- Charles Lamb.** Englishman ; lived between the eighteenth and nineteenth centuries. Wrote Essays (Essays of Elia) and criticisms and letters.
- Juvenal.** Italian ; lived between the first and second centuries A. D. Wrote satires.
- Thomas De Quincey.** Englishman ; lived during the nineteenth century. Miscellaneous writings, specially for reviews and magazines and essays, and his famous "Confessions of an English Opium Eater".
- Ben Jonson.** Englishman ; lived between the sixteenth and seventeenth centuries. Wrote plays.
- W. B. Yeats.** Irish ; lived between the nineteenth and twentieth centuries. Wrote poems, plays and essays.

Q. 163. Following is a list of some well-known Indian writers, living or dead. Mention some of their most important works and the languages in which these works have been written.

Hem Chandra Goswami, Premendra Mitra, Sarat Chandra Chatterjee, Narsingh Mehta, Narmada Shankar, Munshi Raghunandandasa, Samrath Swami Ram Das, Hari Narayan Apte, Fakir Mohan Senapati, Nanak Singh, Madhusudan Rao, Mohammad Hussain Azad, Pandit Ratan Nath Dar, K.M. Pannikar, Subramania Bharathi.

Ans.. Hemchandra Goswami. wrote in Assamese. Works : *Assamiya Sahitya Chaneki* ; Premendra Mitra, wrote in Bengali. Works : *Prathma Samrat* ; *Pank Kuasha* ; Sarat Chandra Chatterji wrote in Bengali. Works : *Srikanta*, *Grihadah*, *Charitrahin*, *Bari Didi*, *Dev Das*, *Len Den*, *Vijaya*, *Dehati Samaj* ; Narsingh Mehta wrote in Gujarati. Works : *Sudama Charitra*, *Chatri*, *Har Mala*, *Chaturi Shodasi*, *Samaldasno Vivah* ; Narmada Shankar wrote in Gujarati. Works : *Atmalakshi Kauiya* ; Munshi Raghunandan Dasaa wrote in Maithli, Works : *Subhadhara-harana* ; Samrath Swami Ram Das wrote in Marathi, Works : *Karunashtak*, *Dasbodh* ; Hari Narayan Apte wrote in Marathi, Works : *Usha Kal*, *Rup Nagar ki Raj Kanya*, *Suryagrahna*, *Gad Alapan Sinh Gela*, *Mysore ka Bag* ; Faquir Mohan Senapati wrote in Oriya. Works : *Mamu*, *Lachhman Prayaschitta* ; Nanak Singh wrote in Punjabi. Works : *Repentences*, *Noble Sinner*, *Pale Shadow*, *Garland of Tears*, *Graduate* , Madhusudan Rao wrote in Oriya. Works : *Rusi Prane Devataram*, Mohammad Hussain Azad wrote in Urdu. Works : *Ab-i-Hayat*, *Nairang-i-Khyal*, *Darbar-i-Akbari*, *Sakhundan Faris* ; Pandit Ratan Nath Dhar wrote in Urdu. Works : *Marasala-i-Kashmiri* (a periodical), *Fisana-i Azad*, *Kadam Dham*, *Bichhdi Dulhan*; K. M. Pannikar is a living author writing in Malayalam. Works : *Pankiparinarayam* ; Subramanya Bharathi wrote in Tamil. Works : *Panchali Sapatham*.

Q. 164. Who created the following characters in fiction ? Name atleast one or two of each of the authors' other equally well-known characters.

(a) Rebecca (b) Soames Forsyte (c) Mr. Pecksniff (d) Mark Tapley (e) Giant Despair (f) Sir Anthony Absolute.

Ans. (a) Rebecca is a character in Scott's *Ivanhoe*. Other characters created by Scott are : Catherine Glover in *Fair Maid of Perth*, Father Ambrose in *The Abbot*.

(b) Soames Forsyte is a character in Galsworthy's *Forsyte Saga*. Other characters in Galsworthy's novels are Fleur Forsyte and Jolyon Forsyte.

(c) Sancho Panza is a character in Cervante's *Don Quixote* ; other character created by Cervantes is Don Quixote in *Don Quixote*.

(d) Mark Tapley is a character in Dicken's *Martin Gyzzelewit*. Other characters created by Dickens are : Sam Weller in *Pickwick Papers* and Mr. Micawber in *David Copperfield*.

(e) Giant Despair is a character in Bunyan's *Pilgrim's Progress*. Other characters created by Bunyan are : Christian in *Pilgrim's Progress*, and Faithful in the same book.

(f) Sir Anthony Absolute is a character in Sheridan's *The Rivals*. Other characters created by Sheridan are : Backbite in *The Schools for Scandals* and Fag in the *Rivals*.

Q. 165. Name eight most well known biographies in the English Language.

Ans. Boswell's *Life of Johnson* ; Southey's *Life of Nelson* ; Scott's *Life* by John Gibson Lockhart ; *Life of Alfred* by Asser ; Harpsfield's "Thomas More" ; Johnson's *Lives of the Poets* ; Walton's "Lives" ; Guedalla's "The Duke".

Q. 166. Relate briefly the plot of any of

- (a) Shakespeare's Plays.
- (b) Dickens' Novels.
- (c) Novels by R.L. Steveson.
- (d) Tagores' Plays.

Any one of the following :—

- (1) Tackerays' *Vanity Fair*.
- (2) Milton's *Areopagitica*.
- (3) Elliot's *Adam Bede*.
- (4) Charlotte Bronte's *Jane Eyre*.
- (5) Stevenson's *Kidnapped*.
- (6) H. G. Wells' *Kipps*.
- (7) Bunyan's *Pilgrim's Progress*.
- (8) Keats' *Lamia*.
- (9) Dumas' *Three Musketeers*.
- (10) Hardy's *Tess of the D'Urbervilles*.
- (11) Goldsmith's *Vicar of Wakefield*.

and (12) Cervantes' *Don Quixote*.

The student is not to write more than 150 words in any one case.

Ans. (a) Shakespeare's Hamlet.

The King of Denmark is murdered by his younger brother Claudius, who marries with indecent haste his brother's wife and supplants his son, Hamlet. The late king's ghost meets Hamlet and reveals to him how he died and who did it and demands vengeance. Hamlet vows obedience, but his introspective and scrupulous nature makes him irresolute and dilatory in action. He counterfeits madness to escape suspicion. He tests the story of the ghost by having a play acted, reproducing almost indetical circumstances of a man's murder and the king betray's himself. Soon after, he violently upbraids his mother and thinking the King is overhearing him, makes a dash at him with his sword and kills Polonius. The king deports him, but Hamlet comes back. The king contrives to get him killed in a fencing match and Hamlet is mortally wounded, but before he falls he stabs the king to death.

(b) Dicken's David Copperfield.

David Copperfield is a posthumous son. His mother, a weak gentle woman marries again one Mr. Murdstone whose cruel treatment drives her to an early grave. David is sent to school where he is bullied by an equally cruel headmaster, but makes friends with a brilliant boy Steerforth. He is next sent to menial employment in London, where he leads a life of poverty and misery, enlivened by his acquaintance with Micawber, a mercurial and imp ecunious man. Next, he runs away to Dover and throws himself on the mercy of his aunt. She takes him kindly, sends him to school. David next enters Doctor's Commons, and is articled to Mr. Spenlow and Jorkins. Soon he meets his old friend Steerforth, whom he introduces to his nurse's family, but Steerforth elopes with their girl and creates hell. Copperfield ultimately marries and settles down and so does his friend Micawber.

(c) Stevenson's Treasure Island

Jim Hawkins, the narrator of the story, lives with his mother, who keeps an inn somewhere on the west coast of England. A buccaneer, who has got a map of information of Captain Flint's treasure in his chest comes to live with them. His former confederates try to obtain possession of this map, but Jim outwits them and delivers this to his friend Squire Trelawney. The Squire arranges for a voyage for the discovery of the Island in the Hispaniola, but unfortunately majority of the buccaneers get recruited under the one legged villain Long John Silver. These men design to seize the ship and kill the Squire's party. This is fortunately discovered and foiled and the Squire with the help of a marooned pirate secures the treasure.

(d) Tagore's Chirakumar Sabha

A humorous sketch based on Bengali middle-class society, *Chirakumar Sabha* (literally, society of confirmed bachelors), depicts how the youthful idealism of a group of young men to remain bachelors for life and devoted to the service of society is foiled as they come in touch with the members of the fair sex. The story is of universal appeal because it is contrived on certain basic human emotions.

Note. We write down the plots of all the books of this question for the benefit of the reader.

(1) *Vanity Fair*

This novel is principally concerned with the parallel careers of two girls : Rebecca Sharp, beautiful, clever and unscrupulous ; and Amelia Sedley, pretty, gentle and unintelligent. After their school is over, Becky accompanies Amelia to her home where she tries to capture her brother Joe Sadley, but not succeeding, becomes governess in the house of the dirty, cynical old Pitt Crawley, who soon proposes to her on the death of his wife, but Becky is already engaged to his son, a worthless fellow. Meanwhile, Amelia's father is ruined and her marriage is forbidden to Osborne by the boy's purse proud father, but is brought about by their common friend Dobbin. Shortly after, George Osborne is killed at Waterloo and the widowed Amelia leads a life of poverty and humiliation. Becky, by her wit and unscrupulousness finds her way into highest society but her immoral escapades bring about her ruin. Dobbin ultimately marries Amelia.

(2) *Milton's Areopagitica*.

The book is a discourse addressed to the 'Lords and Commons of England'. denouncing their restrictions, such as the printing of books, unless these have been first approved and licensed by men appointed by the "House". Such licensing, says Milton, is done only by the hated Papacy and the Inquisition, who hate and dread dissimulation of free thought and criticism. Milton stresses that promiscuous reading is necessary to the constituting of human virtue. Also, any licensing of books will be a grave discouragement to learning as was the case with Galileo, whose imprisonment gave a setback to learning in Italy. Comparing England to an 'eagle mewing its mighty youth', he ends by urging that the youth should not be cooped and confined only to restricted thought.

(3) *Eliot's Adam Bede*

The story of the novel mainly centres round Hetty Sorrel, a beautiful, vain and selfish girl, niece of the genial farmer Martin Poyser, who brings up the orphan, as his own daughter. The girl is loved by Adam Bede, a village carpenter, but is deluded by the prospect of marriage with the young squire, Arthur Donnithorne, the handsome and wealthy landlord of their place and elopes with

him. Arthur wanted only to get pleasure from her body and not to marry her. Meanwhile Hetty discovers that she is pregnant, flies from her home in search of Arthur, fails to find him, is arrested, convicted of the murder of her child and is transported. Adam Bede finds solace in the love of a young Methodist preacher, whose serene influence pervades the whole story. It ends with the self sacrifice of Seth, the younger brother, who loves the Methodist, and the two are allowed to marry.

(4) Bronte's *Jane Eyre*.

Jane Eyre, the heroine, is a penniless orphan living with her aunt, who consigns her to Lowood Asylum, a charitable institution, where after passing many a miserable years, she become a teacher. She becomes governess of a little girl, the natural daughter of one Mr. Rochester—a grim looking man with a sardonic temper. Jane's sweet nature and intelligence captivates him and as Jane has also fallen in love with him, they propose to each other. Just at the nick of the time Jane discovers that his master has a wife, though lunatic and flees from him and goes to live with one Rev. Rivers, whom she nearly consents to marry and to accompany him to India. Soon however, she receives a message from Rochester to see him. Rochester's house has been burnt and in trying to save his house and wife he receives severe burns and is blinded. Jane takes pity on him, marries him and restores him to happiness.

(5) Stevenson's *Kiddnapped*.

The story centres round the murder of Collin Campbell, the 'Red Fox' of Glenure, the King's factor on the forfeited estate of Ardshiel.

Young David Balfour is left penniless on the death of his father and goes for help to his uncle Ebenezer, who unlawfully detains his estate. The uncle, a miserly villian gets him kidnapped to the Carolinas. On the voyage, a Jacobite, Alan Breck is picked up from a sinking boat. The ship itself gets wrecked on the coast of Mull and they journey together. Soon they witness the murder of Colin Campbell, but suspicion falls on them and they have to run for their lives. After a perilous journey through the Highlands they escape and young David soon recovers his lands from his uncle.

(6) H.G. Well's *Kipps*.

Arthur Kipps, a little vulgar, uneducated, 'simple soul, and illegitimate child brought by an uncle and aunt, is apprenticed to a draper, but unexpectedly inherits a fortune. which, after a few days of delirious joy gets him into trouble. He gets engaged to a lady of a superior class, who sets about educating him, but it proves very irksome to Kipps. He belts, marries a girl of his class, soon loses his fortune to a swindler, and the headache giving

wealth being gone, Kipps becomes a small shopkeeper and settles down to a life of calm contentment.

(7) **Bunyan's Pilgrim's Progress.**

The Pilgrim's Progress is an allegory which takes the form of a dream by the author. The main figure is Christian, who on the advice of Evangelist flees from the city of Destruction and in the course of his pilgrimage passes through the Slough of Despond, the Valley of Humiliation, the Valley of the Shadow of Death, Vanity Fair, the Delectable Mountains, the House Beautiful, the Country of Beulah till he reaches the Celestial City.

A similar pilgrimage through the same places is performed by his wife, Christiana in company with her children and her neighbour Mercy.

(8) **Keat's Lamia**

The poet narrates the story of Lamia, a witch, whom the god Hermes, transforms from a serpent into a maiden of dazzling beauty. Lycius, a Corinthian youth is hypnotised by her beauty and falls in love with her and carries her home. The fatuous youth, not content with his happiness makes a bridal feast and summons his friends. Among these came the sage Apollonius, who instinctively pierces through Lamia's disguise and calls her by her real name. Upon this the witch vanishes with a frightful scream to the utter amazement of all present.

(9) **The Three Musketeers by Dumas.**

The romance deals with the life of a poor Gascon gentleman, but a very dashing swordsman, who comes to Paris in the reign of Louis XIII to join the king's musketeers. Here he becomes leader of three equally dashing men, Athos, Porthos and Aramis and shares with them many an adventure.

(10) **Tess of the D'Urbervilles**

Tess is the daughter of a poor but foolish villager, whose head is turned on being told that she is a descendant of the great ancient family of the D'Urbervilles. This enables a young man, Alec, whose parents bear the surname D'Urbervilles to get into the family's favour and ultimately to seduce the girl, who gives birth to a child which dies in infancy. Sometimes after, while working on a dairymaid in a farm, Tess becomes engaged to a clergyman's son, Angel Clare, to whom on the night of her wedding she confesses her previous connection with Alec. Angel deserts her. Soon after, she and her family fall into straightened circumstances and Tess is driven to accept protection of Alec again. Clare repents of his desertion, but finds Tess has murdered Alec in a fit of revenge. In spite of concealment, Tess is arrested, tried and hanged.

(11) Goldsmith's *Vicar of Wakefield*

Dr. Primrose is a kind hearted, amiable gentleman, but devoid of wisdom and is the Vicar of Wakefield. He has two daughters, Sophia and Olivia, and four sons. Through the insolvency of a merchant, he becomes bankrupt and has to take shelter under Squire Thornhill, an unprincipled ruffian who seduces Sophia, and soon deserts her. Soon he sues the doctor for debt and gets him into prison, as also his son George Primrose who has challenged him. Now Olivia is spirited away by an unknown ruffian and is deserted and reported dead. Mr. Burchell, a kindly gentleman comes to their rescue. Now comes the turn of fortune ; Sophia is married to Sir Thornhill, Olivia's marriage is confirmed, George is married and the family fortune is restored.

(12) Cervante's *Don Quixote*

Don Quixote, a poor gentleman of La Mancha, excited by tales of chivalry, starts in search of adventures on an old horse with his servant Sancho Panza. Confirming to chivalric traditions he nominates a girl of a neighbouring village to be the mistress of his heart, without any knowledge of the girl. He gets involved in a number of absurd adventures with distressing consequences to himself. Finally, a friend, Mr. Sampson Carrasco, disguises himself as a knight, overthrows Don Quixote and gets a vow from Quixote not to involve himself in chivalrous exploits for a year. Quixote lives as a shepherd, gets sick and on returning to his village dies soon after.

Q. 167. In which languages were the following books originally written?

The Sorrows of Young Werther ; God and the Woman ; The Blue Bird ; All Quiet on the Western Front ; The Decline of the West ; The Tree of Knowledge ; R.U.R. ; Quo Vadis ; The Three Musketeers ; Ain-i-Akbari ; Piyam-i-Mashriq ; The World as Will and Idea : The Capital ; War and Peace ; The Divine Comedy ; The Prince ; Candide ; The Social Contract ; Philipppics ; Aeneid ; The Odyssey and Seven against Thebes.

Ans. In German : The Sorrows of Wuther, All Quiet on the Western Front, The Decline of the West, The World as Will and Idea, The Capital ; In Norwegian : God and the Woman, In Belgian ; The Blue Bird ; In Spanish : The Tree of knowledge ; In Czechoslovakian : R.U.R. ; In Polish : Quo Vadis ; In French : The Three Musketeers, Candide, and The Social Contract ; In Persian : Ain-i-Akbari and Piyam-i-Mashriq ; In Italian : The Prince ; In Latin : Philipppics and Aeneid ; In Greek : The Odyssey and Seven Against Thebes.

Q. 168. From which book or author come these quotations :—

(a) I don't like the looks of Mr. Sedley's affairs.....He has been dabbling on his own account, I fear..... and unless I see Amelia's ten thousand down you don't marry her. I will have no lame duck's daughter in my family.

(b) A female government is very often eclipsed by marriage.

(c) Genius is two percent inspiration and ninety-eight percent perspiration.

(d) I know I have the body of a weak and feeble woman, but I have the heart and stomach of a king and of a king of England too.

(e) Since it has pleased Providence to place me in this station, I shall do my outmost to fulfil my duty towards my country. I am very young and perhaps in many, though not in all things, inexperienced but I am sure very few have more goodwill, and more real desire to do what is fit and right than I have.

Ans. (a) *Vanity Fair* by Thackeray (b) Bacon (c) Thomas A. Edison (d) Queen Elizabeth (speech to her troops when a Spanish invasion threatened England) (e) Queen Victoria (In her journal when she was told she was Queen of England).

Q. 169. State which of these are novels, poems, comedies or tragedies, and who are their authors ?

Castle Dangerous, *The Castle of Indolence*, a *Cotter's Saturday Night*, *Essay on Criticism*, *Every Man in His Humour*; *How They brought the Good News from Ghent to Aix*, *Dr. Jekyll and Mr. Hyde*, *Kipps*, *The last days of Pompeii*, *Light of Asia*, *Samson Agonistes*, *Misanthrope*, *Orlando Furioso*, *Prometheus Unbound*, *She Stoops to Conquer*, *St. Joan*, and *Woman killed with Kindness*.

Ans. *Novels* : *Castle Dangerous*, by Sir Walter Scott ; *Dr. Jekyll and Mr. Hyde* by R.L. Stevenson ; *Kipps* by H.G. Wells ; *Last days of Pompeii* by Bulwar Lytton ; *Woman in White* by Wilkie Collins.

Poems : *The Castle of Indolence* by Thomson ; *The Cotter's Saturday Night* by Robert Burns ; *Essays on Criticism* by Pope ; *How They Brought the Good News from Ghent to Aix* by Robert Browning ; *Light of Asia* by Sir E. Arnold ; *Orlando Furioso* by Ariosto.

Comedy : *Every man in his humour* by Jonson ; *Le Misanthrope* by Molière ; *She Stoops to Conquer* by Goldsmith.

Tragedy : Samson Aognistes by Milton.

Promethues Unbound is a lyrical drama by Shelley ; *St. Joan* is a historical drama by G.B. Shaw.

Q. 170 What do you understand by the following :—

Blood-horse, Blood and iron policy, Blood and thunder, Blood brother, Blood money, Blood of the Grogams, Blood Council, Blood tax, Bloody wedding and Bloody week.

Ans. *Blood horse*—a horse of the purest and most highly prized blood, origin or stock ; *Blood and iron policy* is a relentless policy of war ; *blood and thunder* means cheap sensationalism and violence such as characterizes a melodrama ; *blood brother* is one who is bound by a blood bond, either by birth or as the result of a ceremonial mingling of blood ; *Blood money* is the money paid to a person for giving such evidence as shall lead to the conviction of another, especially if the charge be false or made by an accomplice. *Blood money* was paid to Judas for his betrayal of Christ : *Blood of the Grogams* is make—believe aristocratic blood or Taffety gentility ; *Blood Council*—The Supreme tribunal established in 1567 in Netherlands by the Duke of Alva to punish the enemies of Spanish rule and the Roman Church ; *Blood tax* is conscription or universal military service ; as drawing from the nation a certain number of live recruits annually ; *Bloody wedding*—The massacre of St. Bartholomew in 1572, so called as it took place during the marriage feast of Henri IV with the daughter of Catherine de Medici ; *Bloody week* is the week ending on May 28, 1871, when Paris was set on fire by the Communists.

Q. 171. Explain the following terms :—

(1) An old Blue (2) A blue-apron statesman (3) Shout blue murder (4) To hoist the blue flag (5) Blue laws (6) A regular brick (7) Buridan's ass (8) Curse of Cain (9) Cap and feather days (10) Carpet-Knight (11) Carthaginian faith (12) Fight like Kilkenny cats (13) Live a cat and dog life (14) Cloak and sword plays (15) The hungary forties (16) Golden wedding (17) To play the Greek (18) Greek gift (19) To out-herod Herod (20) Indian gift.

Ans. (1) An *Old blue* is one who takes part in any of the English inter University contests, in cricket, football, rowing or athletics (2) *Blue apron statesman* is a lay politician, a tradesman who interferes in the affairs of the nation (3) *Shout blue murder* is to get alarmed or terrified though there is no real danger (4) *To hoist the blue-flag* is to turn publican or fishmonger. This term is in allusion to the blue apron worn even now by some English tradesmen (5) *Blue laws*—Rigid puritanical laws passed at various times and places in America during the 17th and 18th centuries,

The object of these laws was to stamp out "heresy," enforce strict observance of Sunday etc. (6) *A regular brick* is a jolly good fellow (7) *Buridan's ass*—a man of indecision (8) *Curse of Cain*—One who is always on the move and has no abiding place is said to be suffering from the curse of Cain (9) *Cap and feather days*—The time of childhood (10) *Carpet knight*—a non-martial knight dubbed at court by favour, not having won his spurs by military service in the field ; (11) *Carthaginian faith*—Treachery (12) *Fight like Kilkenny cats* is to fight till both sides have lost their all (13) *Live a cat and dog life* is to be always snarling and quarrelling as a cat and dog whose aversion to each other is intense (14) *Cloak-and sword plays* are swashbuckling plays, full of fighting and adventure (15) *The hungry forties*—This term refers to the period just before and about the middle of the 19th century, when owing to high import duties on corn, bread and food prices were generally very high (16) *The Silver wedding*—The fiftieth anniversary of the wedding when both husband and wife are alive (17) *To play the Greek* is to indulge in excessive creature comforts, from the supposed habits of the Greek people (18) *Greek gift*—A treacherous gift. The reference is to the Wooden Horse which was offered to the gods for a safe return home, but was in reality a ruse for the destruction of Troy (19) *To out-herod Herod* is to outdo in wickedness and violence even the infamous Herod who destroyed the babes of Bethlehem (20) *Indian gift*—A gift made with the expectation that at an appropriate time it will be returned or a similar one would be made in return.

Q. 172. Following are the opening lines of some well known poems. Complete the lines and give the title of the poems, as well as mention the name of the author of each.

1. Toll for the Brave !
2. O Mary, at thy window be
3. Full fathom five thy father lies
4. Under the greenwood tree
5. Hail to thee, blithe spirit
6. It was a summer evening
7. As thro' the land at eve we went
8. O World ! O Life ! O Time !
9. When Britain first at Heaven's command
10. I wandered lonely as a cloud
11. My days among the Dead are past
12. I come from haunts of coots and hern

Ans. 1. Toll for the Brave !
The brave that are no more !

And sunk beneath the wave
Fast by their native shore !

(from *Loss of the Royal George* by W. Cowper)

2. O Mary, at thy window be,
It is the wish'd, the trusted hour !
Those smiles and glances let me see
That make the miser's treasure poor
How blythely wad I bide the stoure,
A weary slave frae sun to sun,
Could I the rich reward secure,
The lovely Mary Morison.

from *Mary Morison* by Robert Burns)

3. Full fathom five thy father lies :
Of his bones are coral made ;
Those are pearls that were his eyes :
Nothing of him that doth fade
But doth suffer a sea-change
Into something rich and strange
Sea—nymphs hourly ring his knell :
Hark ! now I hear them,—
Ding, Dong, bell

(It is a sea dirge sung by Ariel in *The Tempest* by W. Shakespeare)

4. Under the greenwood tree
Who loves to lie with me,
And tune his merry note
Unto the sweet bird's throat—
Come hither, come hither, come hither !
Here shall he see
No enemy
But winter and rough weather—
(Song sung by Amiens in Shakespeare's *As you like it*)

5. Hail to thee, blithe Spirit !
Bird thou never wert,
That from heaven or near it,
Pourest thy full heart
In profuse strains of unpremeditated art.
(It is from "To A Skylark" by P. B. Shelley)

6. It was a summer evening,
Old Kaspers' work was done,
And he before his cottage door
Was sitting in the sun ;
And by him sported on the green
His little grand child Wilhelmine,
(The passage is from "After Blenheim" by Robert Southey)

7. As thro' the land at eve we went,
And pluck'd the ripen'd ears,
We fell out, my wife and I,
We fell out, I know not why,
And kiss'd again with tears.

(The passage is from 'The Princess, by Alfred Lord Tennyson')

8. O World ! O Life ! O Time !
On whose last steps I climb,
Trembling at that where I had stood before ;
When will return the glory of your prime ?
No more—Oh, never more !

(From 'A Lament' by P. B. Shelley)

9. When Britain first at Heaven's command
Arose from out the azure main,
This was the charter of the land,
And guardian angels sung this strain ;
Rule, Britannia ! rule the waves !
Britons never will be slaves.

(The passage is from "Rule Britannia" by J. Thomson)

10. I wandered lonely as a cloud
That floats on high o'er vales and hills,
When all at once I saw a crowd,
A host of golden daffodils,
Beside the lake, beneath the trees,
Fluttering and dancing in the breeze.

(The passage is from "The Daffodils" by W. Wordsworth)

11. My days among the Dead are past ;
Around me I behold,
Where'er these casual eyes are cast,
The mighty minds of old :
My never-failing friends are they,
With whom I converse day by day

(The passage is from "The Scholar" by R. Southey)

12. I come from haunts of coot and hern
I make a sudden sally
And sparkle out among the fern,
To bicker down a valley.

(The passage is from "The Brook" by Alfred Lord Tennyson)

Q. 173. When and with what objects were the following Literary and cultural organizations founded in India?

(a) Hindustani Talimi Sangh Sevagram (b) Jamia Milia Islamia Delhi (c) Viswa Bharti Santiniketan (d) Indian Council of World Affairs New Delhi (e) The Royal Asiatic Society of Bengal.

Ans. **Hindustani Talimi Sangh** was established in 1938 by the Indian National Congress with the object of working out a programme of National Education for life through manual activity and handicrafts.

(b) **Jamia Milia Islamia Delhi** was founded in 1920 by Maulana Mahamudul Hasan with the object of promoting and providing for the religious and secular education of Muslims in conformity with sound principles of education.

(c) **Visva Bharti** was founded in 1922 by Dr. Rabindranath Tagore with the following objects, among others, of bringing into more intimate relation with one another, through patient study and research, the different cultures of the East on the basis of their underlying unity and to approach the West from the standpoint of such a unity of the life and thought of Asia. Also to provide at Satiniketan a centre for research and study of the religions, literature, history, science and art of Hindu, Buddhist, Jain, Islamic, Sikh, Christian and other civilizations along with the culture of the West.

(d) **Indian Culture of World Affairs** was founded in 1943 with the following objects :—

1. "To promote the study of Indian and International questions, so as to develop a body of informed opinion on world affairs and India's relations thereto through study, research and discussion.

2. To publish books, monographs, periodicals, Journals, papers, pamphlets etc. on Indian and International Affairs.

3. To serve as a clearing house of information and knowledge regarding world affairs etc etc,

(e) **The Royal Asiatic Society of Bengal** was founded in 1784 by Sir William Jones. In the words of the founder "The bounds of its investigations will be the geographical limits of Asia, and within these limits its enquiries will be extended to whatever is performed by man or produced by nature".

Q. 174. Name what you consider to be the most important novels of :

Thomas Hardy, George Meredith, Charles Dickens, Charles Reade, H. G. Wells, George Elliot, Richardson and Rabindranath Tagore.

174. Most important novels of Thomas Hardy are *Tess of the D'urbervilles*, *The Return of the Native*, *The Mayor of Casterbridge*, *Far from the Madding Crowd*, *Jude the Obscure*, *Under the Greenwood Tree* and *A Pair of Blue eyes* ; of Meredith ; *The Ordeal of Richard Feverel*, *Diana of the Crossways*, *The Egoist*, *Evan*

Harrington ; of Dickens : *David Copperfield*, *A Tale of two Cities*, *Great Expectations*, *Martin Chuzzlewit* and the *Pickwick Papers* ; of Charles Reade : *the Cloister and the Hearth* ; of H. G. Wells : *Kipps*, *Tono Bungay*, *History of Mr. Polly* ; *The Time Machine*, *Mr. Britting Sees it Through* ; of G. Eliot : *Adam Bede*, *Silas Mariner*, *The Mill on the Floss* ; of Richardson : *Pamela* and of Tagore *Gitanjali*, *Gora*, *Kumudni*, *Ankhi Kirkri* and *Chare Baire*.

Q. 175. State what these books are—novels, poems, biographies or plays etc. etc. and name their authors :—

Ape and Assense ; *The Naked and the Dead* ; *World without Visa* ; *The Testament of Beauty* ; *Time must have a stop* ; *The Sun also Rises* ; *If I Die* ; *Loyalties* ; *The Constant Nymph* ; *Back to Methuselah* ; *After Many a Summer* ; and *Disraeli*.

175. *Ape and Essence* is a novel by A. Huxley ; *The Naked and the Dead* is a war novel by Norman Mailer ; *World without Visa* is a war time novel by Jean Malaquais ; *The Testament of Beauty* is a poem (philosophical) by Robert Bridges *Time Must have a stop* is a novel by A. Huxley ; *The Sun also Rises* is a novel Earnest Hemingway ; *If I Die* is an autobiography by Andre Gide ; *Loyalties* is a play by Galsworthy ; *The Constant Nymph* is a novel by Margaret Kennedy ; *Back to Methuselah* is a play by Shaw ; *After many a Summer* is a novel by A. Huxley ; *Disraeli* is a biography by Andre Maurois.

Q. 176. Who are the authors of the following works ?

- (a) *The Origin of Species*.
- (b) *The Gardner*.
- (c) *Kim*.
- (d) *Gulistan*.
- (e) *The Invisible Man*.
- (f) *Vande Mastaram*.
- (g) *The Myterious Universe*.
- (h) *One World*.

176. (a) *The Origin of Species* is by Darwin (b) *The Gardner* is by Tagore (c) *Kim* is by Kipling (d) *Gulistan* is by Sheikh Saadi (e) *The Invisible Man* is by H. G. Wells (f) *Vande Mataram* is by Bankim Chander Chatterjee (g) *The Mysterious Universe* is by Sir James Hopwood Jeans (h) *One World* is by Wendel Wilkie.

Q. 177. In which works do the following characters appear ?

- (a) Rozinante.
- (b) The Artful Dodger.
- (c) Dushyanta.
- (d) Iago.
- (e) Rawdon Crawley.
- (f) Mowgli.

177. (a) Rozinante in Don Quixote (b) The Artful Dodger in Oliver Twist (c) Dushyanta in Shakuntla Natak (d) Iago in Shakespeare's Othello (e) Rawdon Crawley in Vanity Fair (f) Mowgli in Kipling's The Second Jungle Book.

Q. 178. What do the following books deal with ?—

- (i) Areopagitica.
- (ii) Erewhon.
- (iii) The Seven Pillars of wisdom.

Ans. (a) Areopagitica is a prose pamphlet by Milton in which he advocates the liberty of unlicensed printing (b) Erewhon is a satirical Utopian romance by Butler vigorously satirizing the hypocrisy, compromise and mental torpor in the institutions which the author comes across and deals with.

(c) The Seven Lamps of Wisdom by Edward Laurence gives an account of the Arab revolt against the Turkish rule during the World War I.

HISTORY

QUESTIONS SET ON HISTORY IN VARIOUS COMPETITIVE EXAMINATIONS

Q. 1. Discuss the significance of 1857 Centenary celebrations. (Your answer should be in about 20 lines.) 15

(Indian Administrative Services Exam. Sept. 1958)

Ans. The Centenary of the 1857 struggle for Indian freedom was celebrated in 1957 all over the country. Its significance may be described in the words of Dr. Radhakrishnan, when in a quite but colourful ceremony, Dr. Radhakrishnan presenting a book, called "Eighteen Fifty-seven" written by Dr. S. N. Sen, to Dr. Rajendra Prasad, said that the War of 1857 was the first challenge to the British rule in India. "We should remember," he said, "with gratitude all those who fell in the struggle for freedom in the last 100 years. Though they are dead, their example lives. If the political freedom we acquired in 1947 is to endure with a social and economic content, we should get rid of the failings in our national character which exposed us to the invader and the spoils for centuries." These words have a significance which must impress itself on our minds. Not only should we on this auspicious occasion remember gratefully the martyrdom of those patriots who laid down their lives hundred years back, but we should, having won what was dear to their hearts, try to mould our social, political and economic pattern different from what it was then and which ultimately led to the failure of that freedom movement.

Q. 2. State, in not more than two lines, the most important event which occurred in each of the following years :—

(a) 327 B.C. (b) 55 B.C. (c) 1066 A.D. (d) 1688 A.D. (e) 1776 A.D. (f) 1789 A.D. (g) 1805 A.D. (h) 1912 A.D. (i) 1917 A.D. (j) 1947 A.D.

(Military College Examination May 1958)

Ans. (a) 327 B.C. Invasion of India by Alexander the Great.
(b) 55 B.C. Invasion of Britain by Julius Caesar.
(c) 1066 A.D. Invasion of England by William the Conqueror and Battle of Hastings.
(d) 1688 A.D. The 'Glorious Revolution' in England and the installation of William and Mary as rulers of England.
(e) 1776 A.D. Declaration of American Independence.
(f) 1789 A.D. Beginning of the French Revolution.

- (g) 1805 A.D. The Battle of Trafalgar.
- (h) 1912 A.D. China becomes a republic.
- (i) 1917 A.D. The Russian Revolution by the Bolsheviks.
- (j) 1947 A.D. India and Pakistan become independent dominions.

Q. 3. Give the dates of the following events :—

Accession of Harshawardhana.

Death of Shivaji.

Battle of Plassey.

Outbreak of the French Revolution.

Exile of Napoleon Bonaparte to St. Helena.

First Session of the Indian National Congress.

Death of Queen Victoria.

Partition of Bengal (during the Viceroyalty of Lord Curzon).

Outbreak of the Second World War.

Launching of the first Soviet Sputnik.

(National Defence Academy Examination June 1958)†

Ans. (i)	Accession of Harshwardhna	606 A.D.
(ii)	Death of Shivaji	1680 A.D.
(iii)	Battle of Plassey	1757
(iv)	Outbreak of the French Revolution	1789
(v)	Exile of Napoleon Bonaparte to St. Helena	1815
(vi)	First Session of the Indian National Congress	1885
(vii)	Death of Queen Victoria	1901
(viii)	Partition of Bengal (during the Viceroyalty of Lord Curzon)	1905
(ix)	Outbreak of the Second World War	1939
(x)	Launching of the first Soviet Sputnik	1957

Q. 4. Give the dates of the following events :—

(a) Declaration of American Independence.

(b) The French Revolution.

(c) Outbreak of the First World War.

(d) The Bolshevik Revolution in Russia.

(e) The Battle of Plassey.

(f) Alexander's invasion of India.

(g) The birth of Gautam Buddha.

(h) The third battle of Panipat.

(i) Vasco da Gama's visit to India.

(j) Conquest of Everest.

(National Defence Academy Examination 1958)

Ans. (a) 4th July, 1776.

(b) 1789.

(c) 1914 (Declaration of War on Serbia by Austria 28th July 1914, which started the ball of the war rolling.)

(d) 1917.

(e) 1757.

(f) 325 B. C.

(g) 623 B.C according to Ceylonese tradition.

(h) 1761 A D.

(i) 1498.

(j) 1953.

Q. 5. Name the following places, persons or books :—

(a) The birth place of Gautam Buddha.

(b) The founder of Jainism.

(c) The oldest collection of Vedic hymns.

(d) Sri Krishna's discourse to Arjun.

(e) The ancient city in West Punjab first entered by Alexander.

(f) The father of King Asoka.

(g) The bloody war which made Asoka renounce war.

(h) The Chinese traveller who visited India during the reign of King Harsha.

(i) The author of Ramcharitmanas.

(j) The ancient Buddhist University near Patliputra.

(k) The king who completed the Kutab Minar.

(l) The popular religious reformer of the fifteenth century who was weaver by profession.

(m) The king who made the first Grand Trunk Road from Bengal to Peshawar.

(n) The pioneer of religious and social reforms in modern India.

(o) The British Viceroy who set up a Government Department for the preservation of ancient monuments.

(Military College Examination 1957) ✕

Ans. (a) Lumbini Garden.

(b) Mahavira Vardhmana.

(c) Rig Veda.

(d) Gita.

(e) Pushkalavati (modern Charsadda) near Peshawar.

(f) Bindusara.

(g) Kalinga.

(h) Hieun Tsang.

(i) Tulsi Das.

- (j) Nalanda.
- (k) Iltutmish.
- (l) Kabir.
- (m) Sher Shah Suri.
- (n) Raja Ram Mohan Roy.
- (o) Lord Curzon.

Q. 6. What important event in Indian or World History took place on each of the following dates ? :—

- (a) 623 B.C. (b) 545 B.C. (c) 327 B.C. (d) 55 B.C. (e) 1066 A.D.
 (f) 1215 A.D. (g) 1498 A.D. (h) 1600 A.D. (i) 4th July 1776 A.D.
 (j) 1789 A.D. (k) 1858 A.D. (l) 1885 A.D. (m) 28th July 1914 A.D.
 (n) 1st Sept. 1939 A.D. (o) 26th November 1949 A.D.

- Ans.** (a) 623 B.C. Birth of Buddha.
 (b) 544 B.C. Death of Buddha.
 (c) 327 B.C. Invasion of India by Alexander.
 (d) 55 B.C. First invasion of Britain by Julius Caesar.
 (e) 1066 A.D. Battle of Hasting and the conquest of England by William of Normandy.
 (f) 1215 A.D. The Magna Carta signed by King John.
 (g) 1498 A.D. Vasco Da Gama lands at Calicut.
 (h) 1600 A.D. Foundation of East India Company.
 (i) 4th July 1776 A.D. The declaration of American Independence.
 (j) 1789 A.D. Washington first President of the U. S. A. and outbreak of French Revolution.
 (k) 1858 A.D. British India placed directly under the Crown.
 (l) 1885 A.D. Indian National Congress holds 1st meeting.
 (m) 28th July 1914 A.D. Austria declared War on Serbia and the 1st World War began.
 (n) 1st September 1939 A.D. Germany attacked Poland and the 2nd World War began.
 (o) 26th Nov. 1949 A.D. New Constitution of India was adopted this day.

Q. 7. With what important battle or war do you principally associate each of the following names ? :—

- (a) Helen of Troy (b) Porus (c) Leonidas (d) Joan of Arc

(e) Prithviraj (f) Ibrahim Lodhi (g) Maharana Pratap (h) Chand Bibi (i) Lord Clive (j) Washington (k) Lord Nelson (l) Duke of Wellington (m) Florence Nightingale (n) Rani Lakshmi Bai (o) Eisenhower.

Ans. (a) Helen of Troy	The Trojan War.
(b) Porus	The battle of Jhelum against Alexander the Great.
(c) Leonidas	The battle of Thermopylae.
(d) Joan of Arc	Local skirmishes in north France to drive out the English from French soil. The English were defeated at Patay by her in one of these skirmishes.
(e) Prithviraj	The battle of Tarain and Thanesar.
(f) Ibrahim Lodhi	1st battle of Panipat.
(g) Maharana Pratap	Battle of Haldighati.
(h) Chand Bibi	The heroic defence of Ahmednagar against the Moghuls under Prince Murad.
(i) Lord Clive	Battle of Plassey.
(j) Washington	The War of American Independence 1779-1783 against the British.
(k) Lord Nelson	Naval battle of Trafalgar.
(l) Duke of Wellington	Battle of Waterloo.
(m) Florence Nightingale	The Crimean War.
(n) Rani Lakshmi Bai	The Great Indian Mutiny of 1857.
(o) Eisenhower	The 2nd World War (invasion of W. Europe under his command).

Q 8. (i) 1. When did Gautam Buddha live and die ?

(ii) Give the date of Alexander's invasion of India and state its significance.

(iii) What is the historic importance of

(a) Hampi (b) Agra (c) Sarnath (d) Madurai.

(Indian Administrative Services Exam. 1956)

Ans. (i) The Buddha lived during the 6th century B. C. Historical dates are : 563-483, According to Sinhalese tradition his death took place in 544 B. C.

(ii) Alexander's invasion of India took place during 325-26 B.C. This date forms the corner stone of Indian history, as this is the most well-known date in ancient Indian history and round it all other historical dates of those times have been fixed in chronological order.

(iii) (a) Hampi is associated with the Hindu kingdom of Vijayanagar in the South whose capital it was. It is witness to man's vandalism, as it was reduced to ruins by the conquering Muslims when they defeated the last ruler of the kingdom at Talikota.

(b) Agra was the capital of the Lodhis and next that of the early Mughals upto Shahjahan. Here was built the great Taj which is the mauselum of Sahjahan's wife Mumtaj Begam.

(c) Sarnath near Banaras has an historical significance, as it was in its Dear Park that the Buddha delivered his first sermon on Nirvana..

(d) Madurai is associated with the visit of Shri Ram Chandra to this place during his wanderings and on his way to attack Lanka. Its other historical importance lies in the great temples by early Hindu dynasties. Meenakshi temple is the most famous among them.

Q. 9. Mention any notable event that occurred in

- | | |
|----------------|----------|
| (a) 567 B. C. | (f) 1931 |
| (b) 327 B. C. | (g) 1935 |
| (c) 1498 A. D. | (h) 1939 |
| (d) 1600 A. D. | (i) 1948 |
| (e) 1919 | (j) 1950 |

(Indian Administrative Services Exam. 1955)

Ans. (a) 567 B. C. Birth of the Buddha,

(b) 327 B. C. Alexander's invasion of India.

(c) 1498 A. D. Vasco-da-Gama reaches India.

(d) 1600 A. D. Establishment of the East India Company.

(e) 1919 The Montague-Chelmsford Reforms.

(f) 1931 The Earl of Wellington as the Viceroy in India ; also the Statue of Westminster came into force.

(g) 1935 The Government of India Act 1935 passed.

(h) 1939 The Second World War began.

(i) 1948. Shri Rajagopalacharya became the first Indian Governor-General of India ; also Britain gives up the Palestine Mandate.

(j) 1950 Inauguration of the new Constitution of India, and Dr. Rajendar Prasad as India's first President/

Q. 10. Give an account of the life and work of any three of the following :—

- (a) Gautama Buddha (b) King Harsha (c) Babar (d) Bal Gangadhar Tilak.

(Indian Administrative Services Exam. 1954)

Ans. (a) Gautama Buddha (563—483 B. C.) the founder of Buddhism was the son of a petty raja of the Sakya clan. For fear of a prophecy that he would renounce the world, his father brought him up in a sheltered life free from sights of pain and grief, but Gautama saw this all while driving in a chariot in the city and this so much affected his mind that he decided to renounce the world. This he did soon after. He wandered about and practiced extreme asceticism but to no avail. At last Enlightenment came to him while meditating under the famous Bodhi tree at a place now called Buddh Gaya. He first preached his doctrine of Nirvana in the deer park at Benaras (Sarnath) and made disciples. He lived upto the mature age of 80.

Buddha is the founder of Buddhism, one of the greatest religions of the world. The greatest service Buddha did to humanity was to turn its mind from the prevailing bloody sacrifices and its unmeaning and elaborate rituals against which he preached and asked people to attain salvation through personal exertion, by noble deeds and noble thoughts and by obedience to and reverence for elders etc. and regard for all life, human and animal. He thus purified the prevailing religion of much of its ugly practices and gave noble ideals of life to the people.

(b) King Harsha. King Harsha Vardhana is one of the greatest figures of the later period of ancient India. Coming to throne in 606 A. D. when only a young man, he carved out a kingdom, which at his death comprised most parts of northern India. Like Akbar, in a later age, he had to face at the time of his accession, a sea of trouble, and like the Great Moghul he successfully overcame all adversaries, playing the part of "a Lion to the Hun deer" who had been ravaging India and had given death blow to the Gupta empire. He avenged the death of his elder brother and the honour of his widowed sister, Rajeshwari, and drove his enemies before him like chaff before wind. When empire was consolidated he performed many religious ceremonies, of which Hieun Tsang, the Chinese pilgrim, who visited India in those days gives a very graphic account.

Harsha, though a Buddhist, patronised both Buddhism and Brahminism. He gave peace and prosperity to his people, but unfortunately he did not have a successor who could keep his kingdom together and carry on his work.

(c) Babar. Babar, the founder of the Mughal Empire in India was a descendant of Timur, the Lame. Coming to a shaky throne, at the teen age of 12, he lost and won it several times, succeeding at last in winning Kabul by prompt and daring movements. He made three incursions into India and ultimately succeeded in winning in 1526 a decisive battle over Ibrahim Lodhi at Panipat. He won another decisive battle at Kanauj over the Rajputs led by the famous warrior Rajput Sangram Singh.

Though he did not live long to enjoy the fruits of his victory he laid the foundations of one of the most illustrious empires of India ; which endured for more than a couple of centuries and by defeating the Rajput confederacy, postponed also for a couple of centuries any attempt at a Hindu revival.

(d) **Bal Gangadhar Tilak.** Tilak came of a Brahmin family that belonged to the famous Peshwas. A great scholar and a fearless speaker, he became, during the early twenties of the present century, the most outspoken leader of the extreme section of the Congress party that believed in action to redress wrongs perpetuated on India by its foreign rulers than in mere sending them petitions which they unceremoniously rejected or ignored.

Q. 11. Give the names of the following:—

(a) The eldest among the Pandu brothers

(b) The great book written by Chanakya, the learned Minister of Chandra Gupta Maurya

(c) Asokas' daughter who carried the teaching of Buddha to Ceylon.

(d) The first Chinese pilgrim who came to India during the reign of Vikramaditya

(e) The language in which Asokas' edicts were written.

(f) The richest temple sacked by Mahmud of Ghazni.

(g) The rival, in wit, of Birbal in Akbar's court

(h) The Emperor who built the Jamma Masjid at Delhi.

(Assistant Grade Exam. Nov. —Dec. 1955)

Ans. (a) Yudhistar (b) Arthshastra (c) Sanghmitra (d) Fahien
(e) Pali (f) Somnath (g) Mulla-do Piazza (h) Shahjahan

Q. 12. Name the following :—

(a) The king, who after winning a great battle, renounced war.

(b) Shakespeare of India.

(c) The most illustrious king of the house of Vardhana.

(d) The son of an Afghan noble of Bihar who became ruler of Bengal and Bihar and finally rose to the Delhi throne.

(e) The most heroic Rajput prince who carried on a long and determined fight against the Moghuls and never submitted.

(f) The widowed daughter-in-law of Shivaji under whom the Marhattas held out bravely against Aurangazeb.

(g) The Guru under whom Sikhs first formed an army:

(h) The last British Governor-General of India.

(Assistant Grade Exam. July 1955)

Ans. (a) Asoka (b) Kalidasa (c) Harsh vardhana (d) Sher Shah Suri (e) Maharana Pratap (f) Tara Bai (g) Guru Har Govind (h) Lord Mountbatten.

Q. 13. What important event in Indian history or culture is commemorated by the following ?

(a) Divalis' illuminations (b) Dussehra celebrations (c) The stupa at Sarnath (d) Kutab Minar near Delhi (e) The Taj Mahal at Agra (f) The Buland Darwaja at Fatehpur Sikri (g) Jai 'Stumbh' in Chittor fort (h) Dargah Sahib at Ajmer (i) Jallianwala Bagh at Amritsar (j) Raj Ghat at Delhi

(Assisstant Grade Exam. July 1955)

Ans. (a) Rama's return to Ayodha after termination of his exile (b) Ramas' victory over Ravana king of Lanka (c) The first sermon of Lord Buddha on Nirvana in the Deer Park at Sarnath and the first batch of his disciples there (d) It commemorates either the victory of the first Muslim rulers of India in India or in memory of a muslim saint (e) Built in memory of Mumtaz Mahal wife of Shahjahan, as her mausoleum (f) Akbars victory of Gujerat. (g) Rana Kumbas victory over Muslim rulers of Malwa (h) Mausoleum of the Muslim saint Moin-ud-din Chishti (i) In this spot were killed by the order of General Dyer hundreds of Indians, while they were holding a public meeting (j) It contains the Samadhi of Mahatma Gandhi.

Q. 14. Give the date of the following :

(a) Alexander's invasion of India 325 - 326 B.C.

(b) Death of Akbar 1605 A.D.

(c) Battle of Plassey 1757 A.D.

(d) Foundation of the Indian National Congress 1

(e) Montague-Chelmsford Reforms 1919, 13

(f) American War of Independence 1776

(g) The French Revolution 1789

(h) Pearl Harbour raid

- (i) Independence of Burma 1948
 (j) Birth of Mahatma Gandhi 1869

(Military College Exam. June 1955)

Ans. (a) 327 B.C. (b) 1605 (c) 1757 (d) 1885 (e) 1919 (f) 1776
 (g) 1789—1799 (h) 1941 (i) 1948 (j) 1869.

Q. 15. Give the dates of the following :—

- (a) Asoka's reign
 (b) Death of Shivaji
 (c) Third battle of Panipat
 (d) The Indian Mutiny
 (e) Minto-Morley reforms
 (f) Discovery of America by Columbus
 (g) Discovery of the sea route to India
 (h) Battle of Waterloo
 (i) Russian Revolution
 (j) World War II

(Military College Exam. Jan. 1956)

Ans. (a) 253-232 B.C. (b) 1680 (c) 1761 (d) 1857 (e) 1909 (f) 1492
 (g) 1498 (h) 1815 (i) 1917 (j) 1939—1945

Q. 16. (a) Mention an important event in Indian history which took place on each of the following dates

- (i) 327 B.C.
 (ii) 1498
 (iii) 1757
 (iv) 1885
 (v) 1930-31
 (b) Mention the dates of the following events :
 (i) The death of Akbar
 (ii) The birth of Mahatma Gandhi
 (iii) Montague Chelmsford Reforms
 (iv) Quit India Resolution
 (v) India becomes a republic

(c) Mention an important event (outside India) which took place on each of the following dates

- (i) 1776 (ii) 1832 (iii) 1912 (iv) 1924 (v) 1914
 (d) Mention the dates of the following events
 (i) The French Revolution

- (ii) The Beginning of the first World War
- (iii) The achievement of Independence by Burma
- (iv) The achievement of independence by Indonesia

(Admission to Military Wing Exam. June 1955.

Exactly the same question also set in Special Class Railway Apprentices Exam. July 1955).

Ans. (a) (i) Alexander's invasion of India (ii) Discovery of India by the Portuguese navigator Vasco-da-Gama (iii) The battle of Plassey (iv) Foundation of the Indian National Congress (v) In 1930 Civil Disobedience by the Congress Party; also the holding of the First Round-Table Conference in London. In 1931 Gandhi Irwin Pact and participation of the Congress in the R. T. C.

(b) (i) 1605 (ii) 1869 (iii) 1919 (iv) 1942 (v) 1950.

(c) (i) The Declaration of American Independence (July 4), (ii) Reform Bill passed in England (iii) The Republic of China came into existence (v) Lenin died this year and Stalin assumed power in Russia.

(d) (i) 1786 (ii) August 1914 (iii) 1948 (iv) Proclaimed: August 1945. Actually achieved 1950. ✓

Q. 17. Mention important events connected with each of the following dates :—

(i) 1948 (ii) 1919 (iii) 1848 (iv) 1917 (v) 1945.

(Military Wing Exam. Jan. 1955).

Ans. (i) 1948 Assassination of Mahatma Gandhi; Shri. Chakravarti Rajagopalachari appointed Governor-General of India; Mr. Jinnah Governor General of Pakistan died. Successful police action in Hyderabad.

(ii) 1919. The famous Treaty of Versailles was signed this year. In India Montague-Chelmsford Reforms inaugurated; also the Jallianwala Bagh massacre on the order of Gen. Dyer took place.

(iii) 1848. In 1848, the Second Anglo-Sikh war broke out.

(iv) 1917. This year the U. S. A. went to war against the Axis Powers; also the Russian Revolution took place; a Russian Republic under the Bolsheviks was proclaimed.

(v) The trial of I. N. A. was held in Red Fort, Delhi.

Q. 18. When and between whom were the following battles fought and with what results? Give dates :—

(a) Battle of Trafalgar (b) Battle of Waterloo (c) Battle of Kalinga (d) Battle of Plassey (e) Fourth Mysore War (f) Fourth Marhatta War.

(Military Wing. Exam. Jan 1954).

- (i) Independence of Burma 1942
 (j) Birth of Mahatma Gandhi 1869

(Military College Exam. June 1955)

Ans. (a) 327 B.C. (b) 1605 (c) 1757 (d) 1885 (e) 1919 (f) 1776
 (g) 1789—1799 (h) 1941 (i) 1948 (j) 1869.

Q. 15. Give the dates of the following :—

- (a) Asoka's reign
 (b) Death of Shivaji
 (c) Third battle of Panipat
 (d) The Indian Mutiny
 (e) Minto-Morley reforms
 (f) Discovery of America by Columbus
 (g) Discovery of the sea route to India
 (h) Battle of Waterloo
 (i) Russian Revolution
 (j) World War II

(Military College Exam. Jan. 1956)

Ans. (a) 253-232 B.C. (b) 1680 (c) 1761 (d) 1857 (e) 1909 (f) 1492
 (g) 1498 ~~(g) 1498~~ (h) 1815 (i) 1917 (j) 1939—1945

Q. 16. (a) Mention an important event in Indian history which took place on each of the following dates

- (i) 327 B.C.
 (ii) 1498
 (iii) 1757
 (iv) 1885
 (v) 1930-31
 (b) Mention the dates of the following events :
 (i) The death of Akbar
 (ii) The birth of Mahatma Gandhi
 (iii) Montague Chelmsford Reforms
 (iv) Quit India Resolution
 (v) India becomes a republic

(c) Mention an important event (outside India) which took place on each of the following dates

- (i) 1776 (ii) 1832 (iii) 1912 (iv) 1924 (v) 1914
 (d) Mention the dates of the following events
 (i) The French Revolution

- (ii) The Beginning of the first World War
- (iii) The achievement of Independence by Burma
- (iv) The achievement of independence by Indonesia

(Admission to Military Wing Exam. June 1955.

Exactly the same question also set in Special Class Railway Apprentices Exam. July 1955).

Ans. (a) (i) Alexander's invasion of India (ii) Discovery of India by the Portuguese navigator Vasco-da-Gama (iii) The battle of Plassey (iv) Foundation of the Indian National Congress (v) In 1930 Civil Disobedience by the Congress Party; also the holding of the First Round-Table Conference in London. In 1931 Gandhi Irwin Pact and participation of the Congress in the R. T. C.

(b) (i) 1605 (ii) 1869 (iii) 1919 (iv) 1942 (v) 1950.

(c) (i) The Declaration of American Independence (July 4) (ii) Reform Bill passed in England (iii) The Republic of China came into existence (v) Lenin died this year and Stalin assumed power in Russia.

(d) (i) 1786 (ii) August 1914 (iii) 1948 (iv) Proclaimed August 1945. Actually achieved 1950. ✓

Q. 17. Mention important events connected with each of the following dates :—

- (i) 1948 (ii) 1919 (iii) 1848 (iv) 1917 (v) 1945.

(Military Wing Exam. Jan. 1955).

Ans. (i) 1948 Assassination of Mahatma Gandhi; Shri Chakravarti Rajagopalachari appointed Governor-General of India; Mr. Jinnah Governor General of Pakistan died. Successful police action in Hyderabad.

(ii) 1919. The famous Treaty of Versailles was signed this year. In India Montague-Chelmsford Reforms inaugurated; also the Jallianwala Bagh massacre on the order of Gen. Dyer took place.

(iii) 1848. In 1848, the Second Anglo-Sikh war broke out.

(iv) 1917. This year the U. S. A. went to war against the Axis Powers; also the Russian Revolution took place; a Russian Republic under the Bolsheviks was proclaimed.

(v) The trial of I. N. A. was held in Red Fort, Delhi.

Q. 18. When and between whom were the following battles fought and with what results? Give dates :—

(a) Battle of Trafalgar (b) Battle of Waterloo (c) Battle of Kalinga (d) Battle of Plassey (e) Fourth Mysore War (f) Fourth Marhatta War.

(Military Wing. Exam. Jan 1954).

	<i>Date</i>	<i>Parties</i>	<i>Result</i>
Ans. (a)	Oct., 21, 1805	British fleet against French and Spanish fleet	British fleet successful
(b)	June 1815	French under Napoleon against the British under Wellington	Napoleon defeated
(c)	261 B. C.	Asoka against the country of Kalinga	Asoka won
(d)	1757	Siraj-ud-Daula Nawab of Bengal against Clive who led the British	Clive won
(e)	1799	Tipu Sultan of Mysore fought against the British.	Tippu defeated and killed
(f)	1817—18	The Marhatta confederacy under Peshwas and Marhatta chiefs like Holkar fought against the East India Company in the time of the Marquiss of Hastings.	Marhattas defeated

Q. 19. How are the following important in Indian History ? :

- (a) **Manu**
- (b) **Akbar**
- (c) **Mohd. Ali Jinnah**
- (d) **Vasco-da-Gama**
- (e) **Asoka**

(Indian Navy Exam. July 1956)

Ans. (a) Manu's importance in Indian history lies in the fact that he has been the universal law-giver to the Hindus through countless centuries. The *Manu Smriti* has been the most sacred and revered law book of the Hindus throughout the ages. Our religious and social legislation has been based on it.

(b) Akbar's importance in Indian history lies not only on the fact that he was one of our greatest empire builders, but mostly on his unbounded religious tolerance, which showed how a great empire could be built by the support of all sections and communities of the Indian people and it would endure and expand so long as all people to whichever religion they belonged were not discriminated, one against the other. He was the first to win the heart of the Rajputs, who gave unstinted support to his empire.

(c) Mohd. Ali Jinnah brought about the partition of our country and promulgated the two nation theory which the Indian National Congress has always refuted.

(d) Vasco-da-Gama opened the way to India via the sea to Western adventurers, which ultimately ended in the foundation of the British empire in India and empires in the East of other European countries.

(e) Asoka's role in Indian history lies in the fact that he brought out Buddhism from obscurity of a sect to the limelight of a great state's religion, which ultimately became one of world's great religions spreading in many lands of Asia. His religious missions also led to contacts of India with the rest of the then known world for commerce, trade and cultural contacts.

Q. 20 What were the events that took place in Indian History on the following dates ? :—

(a) 327 B. C. (b) 606 A. D. (c) 1761 A. D. (d) 1799 (e) 1857 A. D. (f) 1885 A. D. (g) 1905 A. D. (h) 1919 A. D. (i) 1942 A. D. (j) 1950 A. D.

(Indian Navy Exam. Dec. 1955)

Ans. (a) Alexander's invasion (b) Harshvardhana ascended the throne (c) The third battle of Panipat took place and the Marhatta power ended (d) The fourth Mysore War and the death of Tipu (e) The great Indian Mutiny, also called the Sepoy Mutiny (f) Indian National Congress was founded this year. (g) Partition of Bengal (h) Rowlatt Act was passed, Massacre of Jallianwalabagh took place, also Montague-Chelmsford Reforms inaugurated (i) "Quit India" resolution passed by the Congress. (j) India became in 1950 a Sovereign Republic.

Q. 21. What events in Indian History took place on the following dates ?

(a) 563 B. C. (b) 261 B. C. (c) 1336 A. D. (d) 1498 A. D. (e) 1556 A. D. (f) 1858 A. D. (g) 1919 A. D. (h) 1935 A. D. (i) 1948 A. D.

(Indian Navy Exam. July 1955)

Ans. (a) Mahatma Gautam Buddha born (b) Kalinga was conquered by Asoka (c) The Hindu kingdom of Vijayanagar founded (d) Vasco-da-Gama discovered the sea route to India (e) First battle of Panipat (f) The East India Company was dissolved and the Government of India taken over by the British Crown (g) Montague-Chelmsford Reforms inaugurated (h) Govt. of India Act was passed this year (i) Mahatma Gandhi was murdered.

Q. 22. (a) When was the Constitution of independent India adopted and signed ?

(b) When did the trial of the I. N. A. men open ?

(c) What is the date of the Gandhi Irwin pact ?

(d) What is the date of the Lucknow pact of the Indian National Congress and the All India Muslim League ?

(e) When did the Parliament declare as its goal the system of government obtaining in the self governing British colonies ?

(f) Who was the Indian monarch whose court was visited by Hiuen Tsang ?

(g) Who was the Sultan of Delhi who issued a token currency in copper coins ?

(h) Who was the Governor General who also became the first Viceroy of India ?

(i) Who founded the Servant of India Society ?

(j) Who founded the Arya Samaj ?

(National Defence Academy Exam. June)

Ans. (a) It was signed on 26th Nov. 1949 and adopted on January 26th, 1950 (b) 1945 (c) 1931 (d) 1916 (e) 1920 (f) Harsh Vardhana (g) Mohammad Tuglak (h) Lord Canning after the Mutiny (i) Gopal Krishan Gokhale (j) Swami Dayanand Saraswati.

Q. 23. (a) Rewrite the following in the order in which their founders lived. Islam, Buddhism, the Sikhs, Christianity, the Rama Krishna Mission

(b) Using only the names that follow, write down five pairs of people who lived at roughly the same time : Harounal Raschid, Philip of Macedon, Vasco da Gama, Akbar, Napoleon, Cleopatra, Nelson, Julius Caesar, Roger Bacon, Plato, Gautama, Marco Polo, Lenin, Confucius, Monsieur Bleriot, Columbus, Queen Elizabeth, Charlemagne.

(c) Writing down only the word underlined, rearrange the following in their correct order according to time : The emperor Asoka, the composition of the Upanishads, the composition of the Puranas, the visit of Magasthenese to India, the composition of the Rig-Veda.

(d) Rewrite the following in their correct order according to time : Dufferin, Ripon, Harding II, Curzon, Mayo.

(National Defence Academy Exam. Jan. 1956)

Aus. (a) Buddhism, Christianity, Islam, the Sikhs, the Rama Krishna Mission.

(b) Haroun-al-Rashid
Philip of Macedon
Vasco-da-Gama
Gautama

Charlemagne
Plato
Columbus
Confucius

Akbar
Napoleon
Cleopatra
Roger Bacon
Lenin

Queen Elizabeth I
Nelson
Julius Caesar
Marco Polo
Monsieur Bleriot

(c) Rig Veda, the Upanishads, Magasthenese, Asoka, the Puranas.

(d) Mayo, Ripon, Dufferin, Curzon, Harding II.

Q. 24. Answer any ten of the following :—

(a) Who was the girl called by the English general who opposed her, 'best and bravest' of the rebel leaders in the great revolt of 1857 ?

(b) In what year did the Indian National Congress meet ?

(c) Who was it that started in 1911 what are now India's greatest steel and iron works ?

(d) Who was the British Secretary of State for India who came in 1917 to study the country and later wrote a report in conjunction with the viceroy ?

(e) Who was the judge who presided over the committee which decided in favour of prolonging after world war I, the powers exercised by the government under the Defence of India Act ?

(f) Where did the riot occur that caused Gandhiji to withdraw for a time the satyagraha movement he was leading in protest against the massacre at Jalianwala Bagh ?

(g) Who headed the Commission from England that published its report in 1930 ?

(h) With whom did Gandhiji sign a pact suspending civil disobedience before the Second Round Table Conference ?

(i) Who was the British Secretary of State for India responsible for the Government of India Act, 1935 ?

(j) What was the effect on Congress Provincial Government of Lord Linlithgo's announcement in 1939 that India was at War ?

(k) What was the date of the Cripp's mission ?

(l) Who was the last Viceroy of India ?

(m) Who was the last Governor-General of India ?

(National Defence Academy Exam. Jan. 1956)

Ans. (a) Lakshmibai, Rani of Jhansi (b) 1885 (c) Jamshedji Tata (d) Lord Montague (e) Mr. Rowlatt (f) Chaurichaura (g) Sir John Simon (h) Lord Irwin (i) Mr. Amery (j) The Congress Ministries resigned in protest and this was the beginning of political unrest in India (k) 1942 (l) Lord Mountbatten (m) C. Rajagopalachari.

- Q. 25.** (a) What was the Spanish Armada meant for ?
 (b) What did the Monroe Doctrine aim at ?
 (c) What was the Boston harbour Tea Party ?
 (d) What is the Cominform ?
 (e) Who was the first President of the Chinese Republic ?
 (f) What is James Watt known for ?
 (g) What did Bismark's foreign policy achieve ?
 (h) On what issue did the Civil War in the U.S.A. break out ?
 (i) Which governor-general of India suppressed the practice of suttee ?

(Joint Services Wing Exam. June 1955)

Ans. (a) To invade England and seize the throne for Philip, king of Spain. Motive was also religious (to suppress Protestantism in favour of the Roman Catholic faith) and commercial, and to put down finally the English threat to Spain's rule of the seas.

(b) Europe must not molest existing Governments in the New World, and not to set up any European colonies in the New World.

(c) It was a party of American colonists to make anti-British demonstrations, which ultimately led to colonial revolt.

(d) The term means Communist Information Bureau set up in 1917 by Communist Parties of U.S.S.R. and other countries with the purpose of exchanging experience and do communist propaganda.

(e) Dr. Sun Yat-sen.

(f) Invention of the steam engine.

(g) Bismark's foreign policy was to ruthlessly advance by unification of Germany under Prussian leadership and in this he had a great success.

(h) On the question of the emancipation of Negroes and abolition of slave trade.

(i) Lord William Bentinck.

Q. 26. What is the importance of the following dates in Indian history ?

(a) 567 B.C. (b) 273 B.C. (c) 1000 A.D. (d) 1600 (e) 1904 (f) 1914 (g) 1932 (h) 1935 (i) 1948 (j) 1950.

(Air Force Exam. Feb. 1955)

Ans. (a) Lord Buddha was born (b) Asoka's accession (c) The first invasion of Mohammad Gazanavi took place this year (d)

Foundation of the East India Company that was afterwards to rule India (e) This year the Indian Universities Act was passed by Lord Curzon's government. This Act put the universities under official thumbs and prescribed special percentage of scholarships for Muslims (f) The First World War broke out (g) The Communal Award was announced and Mahatma Gandhi fasted in protest against it. Also the Poona Pact with the scheduled classes was signed. (h) Government of India Act was passed. (i) Mahatma Gandhi was assassinated. (j) India became a Sovereign Democratic Republic as from 26th January of this year.

Q. 27. Mention the most important event that took place in India or outside on each of the following dates :

(a) 326 B.C. (b) 274 B.C. (c) 58 B.C. (d) 1018 A.D. (e) 15th June (f) 1215 (g) 4th July 1776 (h) 1789 (i) 1815 (j) 1858 (k) 26th November, 1949.

Ans. (a) Alexander invaded India (b) Asoka ascended the throne about this year (c) Beginning of Vikrama era and also Julius Caesar invaded Britain (d) Somnath temple ransacked by Mahmud Ghazni (e) Magna Carta was granted to the Barons by King John. (f) The Declaration of American Independence (g) The French Revolution broke out this year (h) The East India Company was dissolved and the reign of government was taken up by the British Crown (i) India's Constitution was signed and adopted on this date.

HISTORY

HISTORY

Q. 1. A. Which country was ruled by :—

(a) Alexander the Great (b) Cyrus the Great (c) Frederick the Great (d) Peter the Great (e) Alfred the Great (f) Akbar the Great (g) Charles the Great (h) Mahomet II the Great (i) Clovis the Great (j) Otho the Great and (k) Vladimir the Great and name the centuries during which they ruled.

B. Who are or were : The Great Commoner ; Great Elector ; Great Unknown ; Great Unwashed ; The Grand Monarch and Grand Dauphin.

Ans. A. (a) Macedonia in the 4th century B. C. (b) Persia in the 6th century B. C., (c) Prussia in the 18th century A. D., (d) Russia in the 17th century A. D., (e) Wessex in England in the 9th century A. D., (f) India in the 16th century A. D., (g) France in the 8th century A. D. (h) Turkey in the 15th century A. D., (i) France in the 5th century A. D., (j) Roman Emperor in Italy in the 1st century A. D., (k) Russia in the 10th and 11th centuries A. D., (973-1015).

B. William Pitt the Elder was the Great Commoner ; Frederick William, Elector of Brandenburg was the Great Elector ; Sir Walter Scott who published his Waverley Novels anonymously was the Great Unknown ; the artisan class is called the Great Unwashed ; Louis XIV, King of France was the Grand Monarch ; Louis, the son of Louis XIV was the Grand Dauphin.

Q. 2. Who were the rival combatants in the (a) Seven Years' War (b) Hundred Years' War (c) Thirty Years' War (d) The First World War (e) The Second World War (f) The War of the Roses (g) The Crimean War ?

Name the victorious party in each one of them.

Ans. (a) The war of 1756-1763 between Britain and Prussia on the one hand, and France, Austria and Russia on the other. Frederick, the Great, ultimately came out successful with the help of the British (b) England against France from 1337 to 1453. At first the English were victorious in a number of battles, notably at Crecy, Poitiers and Agincourt ; but ultimately the French drove out the English by successful counter-offensives till only Calais remained with the English (c) The war fought in Germany 1618-48 by the Protestants against the Catholic princes of Germany. The series of battles ended with the defeat of the Hapsburg emperors of Germany by the French and with the treaty

of Westphalia (d) The war of 1914-18 between the Allied Powers (the British empire, Italy, France, U. S. A., Japan, Belgium, Serbia, Montenegro, Greece, Rumania, Portugal) and the Central European Powers (Germany, Austria, Hungary, Turkey and Bulgaria). It ended in the defeat of the latter (e) The war of 1939-45 between the United Nations (Britain, the U. S. A., the U. S. S. R., France and China) and the Axis powers (Germany, Italy and Japan with their satellites). It ended in the defeat of the latter (f) The civil war in England fought between the House of Lancaster and the House of Yorks 1399-1485. It was ended by Henry of Richmond's (Lancastrian) victory at Bosworth in 1485 (f) The war of 1853-6 between Russia on the one side and the Austrians, the Turks, the French, the English and the Sardinians on the other. The latter were successful.

Q. 3. Which people worship or worshipped the God or Goddess (a) Queza Coatli (b) Shiva (c) Horus (d) Ormuzd (e) Phoebus (f) Thor (g) The Mother Goddess ?

Ans. (a) Mexicans (b) Hindus (c) Egyptians (d) Persians (e) The Ancient Greeks (f) Norsemen (g) The people of the Indus Valley Civilization.

Q. 4. What were the capitals of :—

(a) King Solomon (b) Haroun al Rashchid (c) Kublai Khan (d) Nebuchadnezzar (e) Charlemagne (f) King Arthur.

Ans. (a) Jerusalem (b) Baghdad (c) Canbalu (Now Peking) (d) Babylon (e) Aix-la-Chapelle (f) Camelot (now Camilford).

Q. 5. Arrange the following in chronological order :—

Battle of Waterloo ; Battle of Marathon ; The Reformation ; Crimean War ; Battle of Hastings ; End of the Moghul empire ; End of the Roman empire ; The Renaissance ; opening of Suez Canal ; reign of Ashoka and the reign of Sher Shah Suri.

Ans. Battle of Marathon (490 B. C.) ; reign of Ashoka (264-228 B. C.) ; the end of the Roman empire ; the battle of Hastings (1066) ; the Renaissance (14th to 15th century) ; the Reformation 16th century ; reign of Sher Shah Suri (1540-1555) ; battle of Waterloo (1815) ; end of the Moghul Empire (1856) ; Crimean War (1853-56) ; opening of the Suez Canal (1869).

Q. 6. Arrange the following in chronological order :—

First battle of Panipat ; the reign of Harshvardhana ; Fire of London ; Death of Sivaji ; Invention of Printing ; Foundation of the East India Company ; the partition of Bengal ; Discovery of the Sea-route to India by Vasco de Gama ; the battle of Agincourt and the declaration of American Independence.

Ans. The reign of Harshvardhana, Battle of Agincourt (1415); Invention of the Printing Press; Vasco de Gama discovers the route to India (1498); First Battle of Panipat (1526); Formation of the East India Company (1600); Fire of London; Death of Shivaji; Declaration of American Independence; Partition of Bengal (1905).

Q. 7. Mention the principal events that occurred in—

- | | |
|--------------|----------|
| (a) 33 A. D. | (f) 1739 |
| (b) 569 | (g) 1815 |
| (c) 1206 | (h) 1863 |
| (d) 1498 | (i) 1919 |
| (e) 1600 | (j) 1945 |

Ans. (a) In 33 A. D. Christ was crucified (b) In 569 Mohammad was born (c) In 1206 the Mogul Empire was founded (d) In 1498 Vasco-de Gama discovered the sea route to India; also Columbus in his third voyage touched the mainland of America (e) In 1600 the East India Company was formed (f) In 1739 Nadir Shah invaded India. Also England went to war with Spain (g) In 1815 the famous battle of Waterloo took place (h) In 1863 the battle of Gettysburg was fought; also, slavery was abolished in the U. S. A. by proclamation of President Lincoln (i) In 1919 was signed the peace treaty with Germany at Versailles (j) In 1945 I. N. A. trials took place at Red Fort in Delhi; also President Roosevelt died that year; also Charter of the World Security Council was signed i. e., the U. N. O. was born. Hiroshima was also destroyed by the Atom Bomb.

Q. 8. (a) Name the famous Chinese traveller who visited India in the fifth century.

- (b) Who reigned at Delhi when Timur invaded India ?
- (c) Which battle sealed the fate of the kingdom of Vijayanagar ?
- (d) Who was Akbar's minister who effected the famous reforms ?
- (e) Who founded the Indian National Congress ?
- (f) Which viceroy started the co-operative movement in India ?
- (g) By what title was the Indian patriot, Balgangadhar Tilak known ?
- (h) Who was Finance Minister of the Union Government immediately before Mr. Deshmukh ?

Ans. (a) Fa Hien (b) Sultan Mahmud Shah Tughluq
 (c) Battle of Talikota (d) Raja Todar Mall (e) Mr. Allan Hume

(f) The Co-operative Movement in India was started (on the 24th March 1904) in the time of Lord Curzon (g) John Mathai (h) Lokmanya.

Q. 9. Explain the following briefly :—

(a) Lamas of Tibet

(b) Renaissance

(c) Telepathy

(c) Veto

(e) A Blue Book.

Ans. (a) "The Lamas of Tibet is an order of priests of that country belonging to the Mahayan school of Buddhism. The institution of Lamaism was founded by the Indian Missionary Padma Sambhava, about 750 A. D. The 'pope' or the highest priest of the Lamas is the Dalai Lama who lives in the palace of the Potala in Lhasa and is considered to be an incarnation of the Bodhissattya Avalokitesvara. Next to him is the Tashi Lama whose dwelling is a monastery outside Shigatse. He is regarded as the incarnation of the Buddha Amitabha. As soon as a Lama dies steps are taken to find the infant in whom he has been reincarnated. Particular care is taken in the selection of the Dalai and the Tashi Lamas."

(b) The Renaissance was a movement in Europe during the 15th and 16th centuries which began on the fall of Constantinople. It began in Italy and spread over to Western Europe. Among its outstanding characteristics were (1) the emphasis on the potentialities of the individual, and his life, (2) the belief in the power of education to produce the "complete man", (3) the man of action who is the representative of the culture of his age, (4) the desire to enlarge the boundaries of the culture of his age, (5) the growth of scepticism and free thought, (6) the acceptance of Greek and Latin literatures as models.

(c) **Telepathy.** This term was coined by F. W. H. Myers. There is such a mental sympathy between certain persons as enables emotional influences to pass from one person to another at a distance without external means and independently of the ordinary action of the senses.

(d) The **Veto** is a right possessed by a sovereign, a branch of the legislature or some other political power or individual to reject a proposed law or decision. The use of such a veto is frequently seen in the Security Council of the U. N.

(e) **A Blue Book.** Name given to British Government official publications which are often issued in blue paper covers.

Q. 10. Mention any notable event that happened in other parts of the world during the reign of (1) Akbar the Great Moghul

(2) Queen Victoria (3) Catherine the Great, except in their own countries.

Ans. 1. Reign of Akbar 1556-1602. Important events in other parts of the world. (1) Archbishop Cranmer of Canterbury (England) burnt at the stakes in 1556 (2) 1571 Battle of Lepanto between the Christian League and the Turks (3) 1572 Massacre of Huguenots on St. Bartholomew's Day in Paris (4) 1587 Execution of Mary Queen of the Scots (5) 1588 Spanish Armada defeated by the British. British East India Co. was formed.

2. Queen Victoria 1837-1901.

(1) 1852 Louis Napoleon becomes emperor by a *Coup d'etat* (2) 1855 Crimean war (3) 1859-61 War of Italian Liberation (4) American civil war for the emancipation of the slaves and the battle of Gettysburg etc. (5) 1870 Franco-Prussian war (6) 1881 Alexander II, Czar of Russia assassinated (7) 1896 Italians defeated at Adowa.

3. Catherine the Great 1762-96 empress of Russia (1) 1772 First partition of Poland by Russia, Prussia and Austria (2) 1773-1782 American War of Independence fought (3) French Revolution began in 1793. Louis XVI and Marie Antoinette of France beheaded.

Q. 11. Who was called (1) Queen of the Scots (2) Virgin Queen (3) The face that launched a thousand ships (4) The Fighting Prelate (5) The little corporal (6) The bravest of the brave (7) The Iron Duke (8) The Lion of Judah (9) The Light of Asia (10) Corporal John (11) Knight of the Cloak (12) Knights of Malta (13) Knights of the Garter?

Ans. (1) Queen Mary (2) Queen Elizabeth (3) Helen of Troy (4) Henry Spencer of Norwich (5) Napoleon Bonaparte (6) Marshall Michael Ney (7) The Duke of Wellington (8) David (9) Gautama Buddha (10) The Duke of Marlborough. (11) Sir Walter Raleigh who spread his cloak in a mud puddle for Queen Elizabeth to walk upon (12) A celebrated religious military order that fought in the Crusades. (13) An order instituted by Edward III of England in 1344.

Q. 12. (1) Who signed the beard of the King of Spain; also when? (2) Who fiddled while Rome burned? (3) Who wept because there were no more worlds to conquer? Which countries did he conquer? (4) Who was the "Man of Destiny"? (5) Who is regarded as the founder of the Protestantism in Europe? (6) Who was the founder of the Moghul Empire in India? (7) Who was the Last of the Great Moghuls? (8) Who was the Great Iconoclast? (9) Who was the Scourge of Asia? (10) Who referred to that contemptible little army? (11) Who said "The die is cast. I despise

Rome's wrath as I do her favour. I will, if fire can be found publicly condemn and burn the whole population" ?

Ans. (1) Sir Francis Drake. In a raid on Cadiz in 1557 he burnt 10,000 tons of Spanish shipping and thus singed the King of Spain's beard (2) Nero (3) Alexander the Great, King of Macedonia. He conquered Egypt, next the vast Persian empire, then Afghanistan and the Punjab upto the river Ravi (4) Napoleon (5) Martin Luther (6) Akbar the Great (7) Aurangzeb (8) Mahmud of Ghazni (9) Chengiz Khan (10) The Kaiser (11) Martin Luther.

Q. 13. What is or was the official title of the ruler of (a) Udaipur (b) Gwalior (c) Bahawalpur (d) Hyderabad (e) Nawanagar (f) Chitral (g) Ethiopia (h) Japan (i) Iran (j) Cutch ?

Ans. (a) The Maharana (b) Scindia (c) Nawab (d) The Nizam (e) Jam Sahib (f) The Mehtar (g) The Negus (h) Mikado (i) Shah (j) Maharao.

Q. 14. Mention the most noteworthy event of each of the following year :—

(1) 753 B. C. (2) 490 B. C. (3) 399 B. C. (4) 44 B. C. (5) 569 (6) 1517 (7) 1588 (8) 1665 (9) 1815 (10) 1855.

Ans. 753 B.C. Foundation of Rome.

490 B.C. Second Persian expedition against Greece; The Battle of Marathon in which Miltiades was victorious.

399 B.C. Death of Socrates.

44 B.C. Julius Caesar murdered and Antony seizes Rome.

569 A.D. Mohammad born at Mecca.

1517 A.D. Beginning of the Reformation (in Germany).

1588 A.D. The Spanish Armada defeated.

1665 A.D. Great Plague in London.

1815 A.D. Battle of Waterloo.

1855 A.D. The Crimean War.

Q. 15. Who died earlier :

(1) Buddha or Confucius (2) Charlemagne or Haroun al Rashid (3) Tamerlane or John of Arc (4) Socrates or Plato (5) Chaucer or Dante (6) Henry VIII of England or Sulman, the Magnificent (7) Frederick the Great or Louis XVI of France (8) Darwin or Newton ?

Ans. (1) Buddha (2) Haroun-al-Rashid (3) Tamerlane (4) Socrates (5) Dante (6) Henry Eighth of England (7) Frederick the Great (8) Newton.

Q. 16. In which year (approximate dates may be given) did the following events occur ?

(1) Completion of the Great Wall of China (2) Founding of Rome (3) The signing of Magna Carta (4) The Battle of Salamis (5) The First Punic War (6) The discovery of the New World by Christopher Columbus (7) Invasion of Spain by the Moors (8) The storming of the Bastille (9) The Boston Tea Party and (10) Formation of the East India Company ?

Ans. (1) 214 B.C. (2) 753 B.C., (3) 1215 A.D., (4) 480 B.C., (5) 264-241 B.C., (6) 1492 (7) 711 A.D., (8) 1789 (9) 1773 (10) 1600.

Q. 17. Are the years correctly mentioned against the following events ? If not, mention the correct dates against each.

(1) Assassination of Mahatma Gandhi 1946 (2) The Battle of Crecy 1446 (3) The Black Death Plague in Europe 1348 (4) Death of Aurangzeb 1606 (5) The Third battle of Panipat 1761 (6) Founding of the Indian National Congress December 28th, 1875 (7) Government of India Act was passed in 1925 (8) The I. N. A. trials in the Red Fort 1942 (9) The "Quit India" movement was launched by the Congress about a year after the outbreak of the 2nd World War (10) Maharaja Ranjit Singh died in 1839.

Ans. (1) 1948 (2) 1346 (3) Yes, correct (4) 1707 (5) Yes, correct (6) December 28th, 1885 (7) In 1935 (8) 1945 (9) No, only in 1942 (10) In 1839.

Q. 18. Write brief notes on what you know of the following :

(a) (1) Homer (2) Kalidas (3) Haroun al Rashid (4) Hannibal (5) Aristotle (6) Frederick the Great (7) Alfred the Great (8) Luther (9) Confucious and (10) Jan Van Riebeeck.

(b) (1) The Doomsday Book (2) Field of Cloth of gold (3) The Fiery Cross (4) The Fourth Republic (5) Holy Roman Empire (6) Morton's Fork (7) Pitt's India Bill (8) South Sea Bubble (9) Sword-in-hand address (10) Triumvirate (11) Yeomen of the Guard (12) Furies of the Guillotine.

Ans. Homer. A great Greek epic poet who is supposed to have lived between the 11th and 7th centuries B.C., and was a wandering minstrel. He is regarded as the author of the "Iliad" and the "Odyssey" which are considered to be among the greatest books of the ancient world.

Kalidasa. Kalidas, the greatest Sanskrit poet and dramatist is called the Shakespeare of India. He is believed to have flourished about 275 A.D. and was one of the 9 gems in the court of King Vikramaditya of Ujjain. His famous dramas are : Shakuntla, Raghuvarsha, Meghaduta, Malavikagnimitra etc. etc.

Haroun-al-Rashid is the most renowned of the Abbaside Caliphs. He succeeded to the Caliphate in 786 A.D. His court was a centre of attraction to wisemen, scholars and artists, so that under him Baghdad became the capital of the civilized world.

Hannibal. A renowned Carthaginian general who lived in the 3rd to 2nd century B.C. (247-182) and fought many battles against the Romans.

Aristotle is one of the greatest of the Greek philosophers and is regarded as the father of Modern Science based on experiment and strict adherence to truth. 22 of his treatises survive dealing with logic, metaphysics, ethics, politics, astronomy, meteorology, biology, psychology and literary criticism.

Frederick the Great King of Prussia who ascended the throne in 1740. He is the hero of the Seven Years' War 1756-63 in which he had a hard task to hold his own against the Austrians and their Russian Allies. The skill with which he did so proved him to be one of the greatest soldiers of history.

Alfred the Great. One of the noblest and greatest king that England has produced; father of the British Navy. He fought throughout his life to hold back the Danes whom he defeated in many a battle. He tried hard to educate his people and translated many works himself to spread learning among them. He lived in the 9th century A.D. (848-900).

Luther. Founder of the Protestant religion, he made himself famous by challenging the authority of the Pope to sell "indulgences" and even attacking the papal system itself. It was he who made possible the revolt of many a king of Northern Europe against the galling yoke and exactions of Roman Popes. He lived in the fifteenth century A. D. (1483-1546).

Confucius (550-471 B.C.) is one of the greatest sage China produced. He gave the confucian religion to it. His religion is based on the worship and practice of morality as exemplified in the lives and teachings of earlier wise men, who have made the world what it is.

John van Riebeeck was the founder of the Dutch settlement at the Cape of Good Hope in 1652.

(b) (1) **The Domesday Book.** The record of the survey of all the lands of England made in 1085-86 at the instance of William, the Conqueror, for purposes of taxation.

(2) **Field of Cloth of Gold.** Site near Guisnes in France, where Henry VIII met Francis I of France in June 1520; so called from the magnificence displayed on the occasion by both sovereigns and their retinue.

(3) **The Fiery Cross.** A cross dipped in blood and sent to summon the Highland clans to battle.

(4) **The Fourth Republic.** Term applied to the regime established in France after the liberation of 1944. The First, Second and Third Republics were proclaimed in 1792, 1848, 1870 respectively.

(5) **Holy Roman Empire.** Name applied to the empire of Charles the Great (Charlemagne) and his successors and to the German Empire (962-1806) both being regarded as a revival of the Roman Empire.

(6) **Morton's Fork.** The scheme devised by Archbishop John Morton to increase the revenue of Henry VIII (1457-1509).

(7) **Pitt's India Bill.** Bill passed in 1784 reducing the number of councillors from four to three and establishing in England a Board of Control, with the Secretary of States as its President, and defining the powers of the Governor-General.

(8) **South Sea Bubble.** A disastrous financial project intended to relieve the national debt, but resulting in speculation and ruination of thousands of people in England in 1720.

(9) **Sword in Hand Address.** Presented to Queen Anne of England in 1713 by the Highland chiefs.

(10) **Triumvirate.** An alliance between Caesar, Pompey and Crassus for the purpose of dividing powers between them (59 B. C.). The second triumvirate was that of Mark Antony, Octavius, and Lepidus (43 B. C.).

(11) **Yeomen of the Guard.** A military corps which was founded by Henry VII in 1485, and since then has constituted the bodyguard of English Sovereigns. The "Beefeaters" though a different corps, have the uniform of the Yeomen.

(12) **Furies of the Guillotin.** Fearless women who expressed their opinions freely on current affairs, while sitting before the Tribunal of French Revolution.

- Q. 19. 1. Who was the Lame King who sacked Delhi ?
2. Who was the King who carried away the Peacock Throne?
3. Who was the King who broke the Idol of Somnath ?
4. " " " blind King of Delhi ?
5. " " " King who drove the inhabitants of Delhi to Daultabad and back to Delhi ?
6. " " " " who founded the Din Illahi ?
7. " " " " who placed the 'Peacock Throne' in Delhi ?
8. " " " " who converted Buddhism from a sect to a state religion ?

Ans. (1) Tamerlane (2) Nadir Shah (3) Mahmud (4) Shah Alam II (5) Muhammad Tuglak (6) Akbar (7) Shah Jahan (8) Asoka.

Q. 20. Mention the most important event which took place in India or another country on each of the following dates :—

- | | |
|---------------------|-------------------------|
| (a) 326 B. C. | (f) 4th July, 1776 |
| (b) 274 B. C. | (g) 1789 |
| (c) 58 B. C. | (h) 1815 |
| (d) 1018 A. D. | (i) 1858 |
| (e) 15th June, 1215 | (j) 26th November 1949. |

Ans. (a) In 326 B. C. Alexander the Great invaded India (b) In 274 B. C. Asoka came to the throne of India (c) In 58 B. C. the Vikrama era began (d) In 1018 Mahmud of Ghazni destroyed the ancient cities of Mathura and Kanauj (e) The Great Magna-carta was signed by King John of England (f) On 4th July, 1776 was made the Declaration of American Independence (g) In 1789 the French Revolution broke out ; also Washington was made the first President of the Republic of the U.S.A. (h) In 1815 was fought the battle of Waterloo (i) In 1858 the Crown assumed the Government of India and Lord Canning became the first Viceroy of India (j) On 26th November 1949 the Constitution of the Republic of Bharat was adopted and signed.

Q. 21. What is the most notable contribution made by each of the following to the cultural history of India ?—

- | | |
|---------------------|------------------------------|
| (a) Asoka | (g) Lord Curzon |
| (b) Kalidas | (h) Pt. Madan Mohan Malaviya |
| (c) Tulsidas | (i) Uday Shankar |
| (d) Akbar the Great | (j) Dr. S. Radhakrishnan |
| (e) Panini | |
| (f) Lord Macaulay | |

Ans. (a) Asoka taught his subjects to obey their parents and elders, to respect animal life, to show proper courtesy to others, abstain from speaking evil of others, to treat in a kind way slaves and servants and set a personal example to his subjects by leading the simple and pure life of a Buddhist monk. He also advanced the Pali language and by carrying the message of the Buddha to foreign lands, spread Indian culture in those lands. All this was in every way a great contribution to the cultural advancement of the country.

(b) Kalidas' immortal dramas which display the highest pitch of intellect and poetry are a great source of cultural advancement of the country.

(c) How great Tulsidasa's writings, specially his famous Ramcharitmansa or "The Pool of Ram's Life" have contributed to the cultural life of the country may be restated in Grouse's observation that "his book is in every one's hand, from the court to the cottage, and is read and heard and appreciated alike by every class of the Hindu community, whether high or low, rich or poor, young or old". He was not only a great poet, but also the spiritual teacher of his people. He has spread the Rama cult throughout India.

(d) The claim of Akbar's contribution to the cultural history of India really rests on his great catholicity of views and his universal tolerance in matters of religion, by which he set an example for other great rulers and government heads.

(e) Panini the great grammarian has given us the finest Vedic Grammar (Vyakaran) which is regarded as the shortest, but most complete book of grammar in any language.

(f) Lord Macaulay's carrying the day in the controversy as to whether the Western or the Eastern literatures should be taught in schools and colleges in India, in favour of the former, introduced us to the priceless literature of the West and to modern thought.

(g) Lord Curzon preserved for us ancient monuments, and by passing the Universities Act, recognised the higher functions of the Universities, including instructions of students, equipment of libraries and museums etc. Thus he gave impetus to higher learning.

(h) Pandit Madan Mohan Malviya by his tireless efforts has given us the great Hindu University.

(i) Uday Shanker has revitalized for us the ancient classical dances.

(j) Dr. S. Radhakrishnan has opened up for us the learnings of the ancient past by his great philosophical studies. His books like the Hindu View of life are a great exposition of ancient Indian thought and culture.

Q. 22. When and between what powers were the following treaties made and which war did each end :

(a) Treaty of Utrecht (b) Treaty of Brest-Litovsk (c) Treaty of Versailles ?

Ans. (a) In 1713, the War of the Spanish succession was ended by the Treaty of Utrecht. The contending parties were Britain, Austria, the Netherlands, Portugal and Denmark on the one side and France, Spain, and Bavaria on the other (b) It was an agreement between Russia and Germany signed in March 1918, by which the war was ended between them. (c) The treaty of Ver-

sailles was signed on June 28, 1919, between the allies (consisting of the British empire, France, U.S.A., Italy, Japan, Belgium, Serbia, Montenegro, Rumania, Greece, Portugal, Russia etc.) on the one hand, and the Central Powers (consisting of Germany, Austria, Hungary and Bulgaria) on the other, ending the Great War. (The First World War.)

Q. 23. Give the year in which each of the following happened :—

(1) Abdication of King Edward VIII of England (2) Hitler became Chancellor of Germany (3) Japan attacked Pearl Harbour (4) The Dumbarton Oakes Conference in Washington (5) American aeroplanes drop atom bombs on Japanese cities of Hiroshima and Nagasaki (6) Italy became a republic (7) The Nazi War Criminals sentenced to death by Nuremberg tribunal (8) Death of Lenin.

Ans. (1) 1936 (2) 1933 (3) 1941 (4) 1944 (5) 1945 (6) 1946 (7) 1946 (8) 1924.

Q. 24. Mention the countries of Europe which still have kings.

Ans. (1) England (2) Sweden (3) Norway (4) Denmark (5) Belgium (6) Greece (7) The Netherlands (8) Luxembourg, which has a Grand Duchy.

Q. 25. Who designed, engineered, or built :—

(a) The Taj Mahal at Agra (b) The Panama Canal (c) The Pyramids at Gizeh (d) The Suez Canal (e) Fatehpur Sikri (f) The Red Fort at Delhi (g) The Fort of Agra (h) St. Paul's Cathedral (i) The Fort of Lahore (j) The Jama Masjid of Lahore (k) The Rashtrapati Bhawan at Delhi ?

Ans. (a) Shah Jahan (b) Originally by a company headed by the French engineer Ferdinand de Lesseps (1880-1884) and then 1904-1914 by the U.S.A. government (c) The great Pyramids were built in about 29th century B.C., by the 4th Dynasty Kings of Egypt (d) The French engineer Ferdinand de Lesseps (e) Akbar the Great Moghal (f) Shah Jahan (g) Akbar (h) Sir Christopher Wren (i) Akbar (j) Aurangzeb (k) Sir Edward Lutyens.

Q. 26. (1) Who presented himself to the house of Commons with the historic "blood and tears and sweat" speech.

(2) Who unfurled his flag with the following famous lines inscribed on it :—

"England expects that every man will do his duty" ?

(3) Who said "Father I cannot tell a lie. I did it with my little hatchet" ?

(4) To whom are ascribed the words : Vini, Vidi, Vici, (I came, I saw, I conquered) ?

(5) and the famous line :—

Government of the people, by the people, for the people shall not perish from the earth.

(6) Who was the king who walked three times round the bed of his son and then cried "I have borne it away! I have borne it away!"?

(7) Who said and on what occasion "Every blow that they hurled at me, drove one more nail into the coffin of their Empire?"

8. Who was the famous man in Ancient Greece, who said at the end of his trial, "And now that you have condemned me, I would fain prophecy to you; for I am about to die, and in the hour of death men are gifted with prophetic power. And I prophesy to you who have sentenced me to death, that immediately after my departure punishment far heavier than you have inflicted on me will surely await you For I say that there will be more accusers of you than there are now, accusers whom hitherto I have restrained; and as they are younger they will be more inconsiderate with you, and you will be more offended at them...that is the prophecy which I utter before my departure..."

Ans. (1) Winston Churchill (2) Nelson (3) George Washington (4) Julius Caesar (5) Abraham Lincoln (6) Babur, when Humayun lay seriously ill. (7) L. Lajpat Rai in a public meeting in Lahore after he received lathi blows from the British Police when demonstrating against the Simon Commission (8) Socrates.

Q. 27. Who was (1) the King who got himself declared the head of the Church in England (2) The King who has been called the "Napoleon of India" (3) The American President who abolished slavery in America (4) The last of the Hindu kings who sat on the throne of Delhi (5) The last Sultan of Delhi (6) The admiral who defeated the French in the battle of the Nile (7) The British Empire minister who died broken hearted on hearing the news of the defeat of his allies at Austerlitz. (8) The famous General who crossed the Rubicon.

Ans. (1) Henry VIIIth (2) Chandragupta II (3) Abraham Lincoln (4) Prithvi Raj Chauhan (5) Ibrahim Lodhi (6) Nelson (7) William Pitt the Younger (8) Julius Caesar.

Q. 28. Place the following historical events in their chronological order (1) The completion of the Great Wall of China (2) The death of Alexander the Great (3) The death of Gautam Buddha (4) The death of Chandragupta Maurya (5) The death of Darius King of Persia (6) The conquest of Britain by Julius Caesar (7) The sacking of Rome by the Vandals (8) The Discovery of America (9) Battle of Bismark (10) Battle of the

Somme (11) The first battle of Panipat (12) The Battle of Hastings (13) Nadir Shah's invasion of India.

Ans. (1) Death of Gautma Buddha (2) The Death of Darius King of Persia (3) Death of Alexander the Great (4) The Death of Chandra Gupta Maurya (5) The completion of the Great Wall of China (6) The conquest of Britain by Julius Caesar (7) Sacking of Rome by the Vandals (8) The Battle of Hastings (9) Discovery of America (10) The first battle of Panipat (11) Nadir Shah's invasion of India (12) The Battle of the Somme (13) Battle of Bismark.

Q. 29. (1) Who said ? : "I have no further territorial claims to make in Europe."

(2) Who was the man of blood and Iron ?

(3) Who contemptuously described the English as a nation of shopkeepers ?

(4) When did the term "Fifth Column" originate ? Who originated it, and under what circumstances ?

(5) Give in order the names of the Great Mughul Emperors in India.

(6) Who said " I am the State " ? (L'etat C'est Moi.)

(7) Who unsuccessfully bade the waves of the sea to roll back ?

Ans. (i) Hitler (ii) Bismark (iii) Napoleon (iv) The term "Fifth Column" originated in the Spanish Civil War of 1936—39, when the nationalists under General Franco attacked Madrid in four columns from the outside, while their adherents organized uprisings, espionage and sabotage inside. The nationalists referred to these helpers behind the lines as their "fifth column". (v) Babar, Humayun, Akbar, Jahangir, Shahjahan and Aurangzeb. (vi) This is alleged to have been said by Louis XIV of France (vii) King Canute of England.

Q. 30. Who was or is :

(a) The first President of America.

(b) " " " " Turkey.

(c) " " " " Bharat.

(d) " " labour Prime Minister of England.

(e) " " governor-general of India.

(f) " " Viceroy of India.

(g) " " Roman emperor to embrace Christianity.

(h) " " moslem king of Delhi.

Ans. (a) George Washington (b) Kamal Ataturk (c) Dr. Rajendra Prasad (d) Ramsay Macdonald (e) Warren Hastings (f) Lord Canning (g) Constantine The Great (h) Qutab-ud-Din Aibak.

Q. 31. Who are or were in the Republic of Bharat the first (1) Governor of Assam (2) The Defence Minister of India (3) The Governor of the Uttar Pradesh (4) The Chief Minister of Assam (5) The Speaker of the Parliament (6) Bharat's ambassador to the U. S. A. (7) High Commissioner of the United Kingdom (8) Minister who brought about the Integration of Indian States.

Ans. (1) Sir Akbar Hydari (deceased) (2) Sardar Baldev Singh (3) Sarojini Naidu (deceased) (4) Gopinath Bardoloi (deceased) (5) G.V. Mavlankar deceased (6) Mr. Asaf Ali (deceased) (7) Sir Archibald Nye (8) Sardar Patel (deceased).

Q. 32. What are or were the titles of the rulers of the following states :

(1) Bhopal (2) Patiala (3) Rajkot (4) Nepal (5) Pataudi (6) Baroda (7) Indore (8) Rampur.

Ans. (1) Nawab (2) Maharaja (3) Thakor Sahib (4) Maharaja-dhiraj (5) Nawab (6) Gaekwar (7) Holkar (8) Nawab.

Q. 33. Name (a) the chief religions of Asia and (b) the countries where majority of their adherents are to be found.

Ans. (a) (1) Hinduism (2) Jainism (3) Buddhism (4) Confucism (5) Shintoism (6) Taoism (7) Zoroastrianism (8) Judaism (9) Muhammedanism (10) Christianity.

(b) (1) Hinduism, Jainism and the Parsees in Bharat (2) Buddhism in Burma, Malaya, Indo-China, China, Korea and Japan (3) Confucism and Taoism in China (4) Judaism in Palestine, Iran, Iraq, Syria and South India (only very small minorities in the four last named countries) (5) Shintoism in Japan (6) Muhammedanism in Pakistan (East and West), (a large minority) in Bharat, Afghanistan, Syria, Iran, Iraq, Jordan, Palestine, the U. S. S. R. (and China, small minorities) Asiatic Turkey, Arabia, Malaya, and the Republic of Indonesia (7) Christianity in the Philippine Islands; Asiatic part of the U. S. S. R. and as microscopic minorities in most of the countries of Asia.

Q. 34. What famous man died at (1) The Battle of Hastings (2) Battle of Thanesar (3) The first Battle of Panipat (4) The Battle of Trafalgar (5) The second Battle of Panipat (6) Battle of Zutphen (7) The Siege of Seringapatam (8) The siege of Quebec (9) The siege of Khartoum.

Ans. (1) Harold II King of England (2) Prithviraj Chauhan (3) Ibrahim Lodhi (4) Nelson (5) Hemu (6) Sir Philip Sydney (7) Tippu Sultan (8) Wolfe (9) General Gordon.

Q. 35. Which of these met death at the hands of the assassin :

(a) Gautama Buddha (b) Julius Caesar (c) Martin Luther
(d) Abraham Lincoln (e) Nadir Shah (f) Muhammad Ghorī
(g) Dr. Dollufuss, Austrian Chancellor (h) Lenin (i) Trotsky (j)
General Goering (k) Her Hitler (l) Aung San, Burmese Premier
(m) Mahatma Gandhi (n) Mahavira (o) General Rommel (p)
Darius Codomanus ?

Ans. Julius Caesar ; Abraham Lincoln ; Nadir Shah ; Muhammad Ghorī ; Dr. Dollufuss ; Trotsky ; Aung San ; Mahatma Gandhi ; Darius Codomanus.

Q. 36. With what movements, religious, political, literary etc., do you associate the following ? :—

(1) Ramanuj (2) Dayanand Saraswati (3) Martin Luther
(4) Balgangadhar Tilak (5) Wordsworth (6) Ignatius Lyoalla
(7) Alexander Pope (8) Raja Ram Mohan Roy (9) Wycliff (10)
Karl Marx (11) The Inquisition.

Ans. (1) The Bhakti Cult and an effort at Hindu-Muslim Unity in India (2) Reformation of Hinduism, culminating in the movement of the Arya Samaj, with a watchward of "Back to the Vedas" (3) Foundation of Protestantism and a challenge to the authority of the Pope and all the malpractices, such as issuing of 'indulgences' with which it was sapping the Christian society (4) Demand of Swaraj for India and the Swadesi Movement (5) Revival of Romanticism in English poetry and worship of nature (6) Foundation of the Jesuit society to defend the Roman Church (7) The classical movement in English poetry (8) Foundation of the Brahmo-Samaj, to fight such practices as Satee, child marriage, opposition to widow remarriage, idolatory etc. (9) Religious reforms, especially denunciation of such fundamental doctrines of the Roman Church as priestly absolution, confession and indulgences (10) The foundation of the philosophical system, known as scientific socialism, to do away with the system of capitalism and creation of a society in which the "dictatorship of the proletariat" is established (11) This was a court established by Pope Gregory IX in 1235 to torture heretics against the Roman Catholics Church, to serve as a means of extracting recantation or evidence. Those found guilty were handed over to the secular arms to be dealt with according to the secular laws of the land.

Q. 37. What important events happened in each of the following years.

(1) 622 (2) 1757 (3) 1772 (4) 1789 (5) 1947 (6) 1950 (7) 1857 (8) 1945 (9) 1588 (10) 1649.

Ans. (1) Hijra or flight of Mohammad to Medina in Arabia. Date marks beginning of Mohammadon Calendar (2) The battle of

Plassey and the foundation of the British Power in India (3) First partition of Poland by Russia, Prussia and Austria (4) Washington inaugurated as 1st President of the U. S. A. ; also beginning of the French Revolution, and the storming of the Bastille (5) India divided into Bharat and Pakistan and both countries became Dominions of the British Empire (6) North Korea attacks South Korea. The U. N. declares North Korea as the aggressor and calls upon the member nations to fight the North Koreans (7) The first revolt of the Indians against the alien rule of the English called also the Indian Sepoy Mutiny ; also end of the rule of the East India Company (8) End of World War II ; the use of the Atom Bomb on Hiroshima and Nagasaki in Japan ; also the inauguration of the United Nations Organisation (9) The Spanish Armada is defeated by the British (10) Charles 1st of England was beheaded in London after trial for treason, and commonwealth established.

Q. 38. Give the country, century and title to fame of :—

(1) Newton (2) Shivaji (3) Jenner (4) Leonardo da Vinci (5) Peter the Great (6) Firdausi (7) Copernicus (8) Dr. Nansen (9) Ronald Ross.

Ans. (1) Sir Issac Newton (1642-1727) (Englishman) born at Woolstrophe in the 17th century is one of the greatest thinkers of all times. He is one of those great men who substituted observation and experiment for tradition and authority and thus made possible the tremendous advances in knowledge. It was he who first propounded the universal laws of gravitation (2) Shivaji (Indian) born at Poona in the 17th century, is the last Great Hindu King who gave birth to the Marhatta nation and was instrumental in shattering the structure of the Mughal Empire in India (3) Edward Jenner was born in 1749 (in the 18th century). An English Physician, he made his name immortal by the discovery of vaccination. Smallpox is no more the dreaded disease that it was before his time (4) Leonardo da Vinci, Italian (1452-1519), lived in the fifteenth century. A painter, sculptor, architect, musician, engineer and scientist, he is regarded as the greatest versatile genius the world has known (5) Peter the Great (1672-1725) Russian Tsar, belongs to the 17th century. It was he who lifted his country from its mediaeval barbarism, set it on western lines, modernised his army, built a navy, remodelled the administration and the legal system and encouraged education. He is thus one of the greatest rulers that Russia has produced (6) Firdausi (A.D. 940-1020) is one of the greatest of Persian poets. He flourished in the tenth century. He is famed for his epic poem, the *Shahnama*, the Book of Kings, which relates the history of Persia in 60,000 verses (7) Copernicus (1473-1543) Polish astronomer who lived between the fifteenth and 16th century. He is the father of modern astronomy. It was he who first proved that the sun is the centre of our system and not our earth (8) Fridjof Nansen (1861-1930) Norwegian ex-

plorer, was the first man to reach near the North Pole (9) Sir Ronald Ross (1857-1932) was an Englishman though born in India. He is the discoverer of the malarial parasite that destroys millions of human lives in the tropics. By his studies of its life history he has made it possible to control this fell disease and it is for the future governments to adopt preventive measures and exterminate it.

Q. 39. (a) Who according to you was the greatest king of ancient India ?

(b) Who was the greatest among the so-called Slave kings of India ?

(c) Who is regarded as the greatest king of England ?

(d) Who are regarded as the two greatest generals of the Ancient world, and who is the greatest general of the Modern Age ?

(e) (i) Who was the man of blood and iron (ii) Man of Destiny (iii) Man of Sorrows (iv) Man of the Third Republic (v) Sick Man of the East ?

(f) Who were the Knight Templars and the King of Rome ?

Ans. (a) Asoka (b) Balban (c) Alfred the Great (d) (i) Alexander the Great and Julius Caesar (ii) Napoleon (e) (i) Bismark was the man of blood and iron (ii) Napoleon Bonaparte who looked on himself as an instrument in the hands of destiny (iii) Jesus Christ is called the Man of Sorrows (iv) Napoleon III is called the Man of the Third Republic (v) The Turkish Empire was called the Sick Man of the East (f) The Knight Templars were a famous order of knighthood founded at the beginning of the 12th century for service in the Holy Land (Palestine). They used to call themselves the "Poor Soldiers of the Holy City." The King of Rome was title given at his birth to Napoleon Francois Charles Joseph son of Napoleon I and Marie Louise.

Q. 40. With which country and in which capacity the following historical or legendary figures are associated :

(1) William the Conqueror (2) William the Silent (3) William Tell (4) William of Orange (5) William the Lion ?

Ans. (1) With Normandy and as Conqueror of England (2) Prince of Orange, as the leader of the anti-Spanish party (3) Switzerland (Swiss Patriot) (4) King of Great Britain and Ireland (5) King of Scotland.

Q. 41. How did they die :—

King Charles the First ; Philip of Macedon ; Thomas Becket ; Joan of Arc ; Padmini ; Socrates ; Ganesh Shanker Vidyarthi ; J.A. Garfield.

Ans. King Charles the First was beheaded ; Philip of Macedon was assassinated ; Thomas Becket was assassinated ; Joan of Arc was burnt to death at the stakes ; Padmini burnt herself to death to save her honour ; Socrates was forced to take poison ; Genesh Shankar Vidyarthi was stabbed to death in a communal fracas ; J. A. Garfield was assassinated.

Q. 42. (a) With what Royal House is associated the Golden Age of Indian History.

(b) What was the Din Ilahi ? Who founded it ?

(c) What Hindu king is reputed to have 'nine gems,' in his court. Name the brightest of these 'gems'.

(d) What is meant by :—

(1) The Continental System.

(2) Cockpit of Europe.

(3) The Beggars of the Seas.

(4) Hearth Money.

(5) The Opium War.

(6) The Pale.

(7) The Round heads.

(8) States-General.

(9) Templars.

(10) Pretenders.

Ans. (a) The Gupta dynasty (b) It was an attempt at producing a middle course of religion, synthesizing all that Akbar conceived to be the best in all the religions of world, leaving aside their dogmas. He was to be at its head as its founder and the Khatuba was to be read in his name (c) King Vikramaditya or Chandragupta 2nd. Kalidasa was the brightest of them all.

(d) (1) The Continental system : Napoleon's scheme for interdicting all commerce between the continent and Britain in 1806.

(2) Cockpit of Europe. Belgium, on account of many battles fought there.

(3) The Beggars of the Seas. Netherland seafarers, who preyed upon the Spanish commerce in 1569.

(4) Hearth Money. A tax levied on every hearth or fireplace

by Charles II of England in 1662. It existed for about a quarter of a century and yielded £ 200,000 a year. William III abolished it.

(5) **The Opium War.** The name given to hostilities between Great Britain and China in 1840-42, following the destruction of British ships taking opium to China.

(6) **The Pale.** The part of Ireland which was colonized by Henry II in 1175.

(7) **The Round Heads.** The name given contemptuously by the cavaliers to the Parliamentary party during the Civil War, on account of their wearing closely cropped hair—a practice of the lower classes.

(8) **States-General.** Name of the assembly of nobles, clergy and bourgeoisie in France prior to the Revolution of 1789.

(9) **Templars.** A religious order of knights founded in 1119 to protect pilgrims to the Holy Land from Saracen attack.

(10) **Pretenders.** James III and Prince Charles, the son and grandson of James II respectively were called the Elder and the Younger Pretenders.

Q. 43. (a) What is the correct order of time of, Iron age ; stone age ; bronze age ? Between which dates would you place the bronze age.

(b) Which general first crossed the Alps with an invading army ?

(c) Who established the Caliphate ? When was it abolished ?

(d) When and where did the Buxar rebellion take place ?

(e) With what war is the 'Charge of the Light Brigade' associated ?

(f) What name is given to the revival of Art and Letters in Europe that took place between the 14th and the 16th centuries ?

(g) With what notable events in the history of the British occupation of India are the following places associated : Plassey, Seringapatam, Kanpur, Jallianwala.

Ans. Stone Age, bronze age, iron age ; the bronze age between 5000-1200 B.C. (b) Hannibal (c) Abu Bakar. In 1924, the last Caliph was deposed by Kamal Ataturk (d) At Peking in China in 1900 (e) Crimean War (f) The Renaissance (g) Plassey with the Battle of Plassey ; Seringapatam with the fourth Mysore War ;

Kanpur with the massacre of the English in Sepoy Mutiny ; Jallianwala with the massacre of the people of Amritsar at Jallianwala.

Q. 44. Between whom were the following battles fought and which party was successful ? Mention the years in which each battle was fought.

Trafalgar

Leipzig

Jutland

River Plate

EL. Almein

Bismark Sea

Talikota

Poitiers

Crimea.

Ans. Trafalgar. In 1805, between the English and the French, in which the latter were defeated.

Leipzig. In 1813, between the English and the French Emperor, Napoleon. The latter was defeated.

Jutland. In 1916, naval battle between the British under Admiral Jellicosse and the Germans under Admiral Scheer. The battle though inconclusive was a decided British victory since the Germans never ventured out to battle again.

River Plate. In 1939, naval battle off the estuary of the river Plate in which the German "pocket battleship" Admiral Graf Spee was sunk by the English cruisers, Ajax, Achilles and Exeter.

El. Alamein. The most decisive battle of the World War II fought in 1942 in which the Axis armies under the German Rommel were defeated by the British 8th army under Montgomery.

Bismark Sea. Naval battle fought in 1943 between the Japanese and the Americans, in which the latter were victorious.

Talikota. Battle fought in 1564 in which Raja Ram of Vijayanagar was defeated by the confederacy of the muslim kingdoms of Bijapur, Ahmadnagar, Golkonda and Bidar. Raja Ram was slain on the battlefield.

Poitiers. Three battles were fought here :

1. In 507 Alaric was defeated by Clovis.
2. In 732 Charles Martel stemmed the advance of the Saracens.
8. In 1356 Edward the Black Prince defeated the French King John.

Crimea. Series of battles fought during 1853-1856 between the Russians on the one hand and Britain and France on the other. The latter were generally victorious.

Q. 45. Who discovered the following :—

- (a) The Victoria falls.
- (b) The West Indies.
- (c) The North Pole.
- (d) The Cape of Good Hope.
- (e) Cape Horn.
- (f) That the earth revolves round the sun.
- (g) The South Pole.

- Ans.**
- (a) The Victoria falls : Livingstone.
 - (b) The West Indies : Christopher Columbus.
 - (c) The North Pole : Peary.
 - (d) The Cape of Good Hope : Bartholomeu Diaz.
 - (e) Cape Horn : Schouten, Dutch Navigator.
 - (f) That the earth revolves round the sun : Copernicus.
 - (g) The South Pole : Amunsden, Norwegian Explorer.

Q. 46. Give the date of the following events :—

- (a) Outbreak of the World War I.
- (b) The Partition of India.
- (c) Creation of the Republic of Indonesia.
- (d) The Roman conquest of Great Britain.
- (e) The French Revolution.
- (f) The Birth of Jesus Christ.
- (g) The Declaration of Independence of America.
- (h) The North Atlantic Treaty.
- (i) The death of President Roosevelt.
- (j) The Great Plague in London.
- (k) The crossing of the Rubicon by Julius Caesar.

- Ans.**
- (a) Outbreak of the World War I : 1914.
 - (b) The Partition of India : 1947.
 - (c) Creation of the Republic of Indonesia : 1950.
 - (d) The Roman Conquest of Great Britain : 55 B.C.
 - (e) The French Revolution : 1789.
 - (f) The Birth of Jesus Christ : 4 B. C. (according to many historians).

- (g) The Declaration of Independence of America : 1776.
- (h) The North Atlantic Treaty : 1950.
- (i) The Death of President Roosevelt : 1945.
- (j) The Great Plague in London in : 1665.
- (k) Crossing of the Rubicon by J. Caesar in 49 B.C.

Q. 47. In what year did the following happen ?

- (a) Chinese People's Republic proclaimed
- (b) The Bolshevik revolution in Russia
- (c) The United Nations Organization founded
- (d) Magna Carta proclaimed
- (e) Execution of Charles I
- (f) Scotland and England united.

- Ans.**
- (a) Chinese People's Republic Proclaimed : 1949.
 - (b) The Bolshevik Revolution in Russia : 1917.
 - (c) The United Nations Organization founded : 1945.
 - (d) Magna Carta Proclaimed : 1215.
 - (e) Execution of Charles I : 1649.
 - (f) Scotland and England united : 1603.

Q. 48. Name the most important event which occurred in world's history in each of the following years.

- (a) 480 B. C.
- (b) 327 B. C.
- (c) 55 B. C.
- (d) 1066 A. D.
- (e) 1215 A. D.
- (f) 1776 A. D.
- (g) 1789 A. D.
- (h) 1950 A.D.

- Ans.**
- 480 B. C. Battle of Thermopylae.
 - 327 B. C. Alexander's expedition to India.
 - 55 B. C. Caesar invades Britain.
 - 1066 A. D. Battle of Hastings.
 - 1215 A. D. Magna Carta signed.
 - 1776 A. D. Declaration of American Independence.
 - 1950 Republic of India proclaimed.

Q. 49. Underline the correct date among the dates given for each of the following events :—

(a) Outbreak of the World War 1, 1878, 1914, 1919 (b) Battle of Trafalgar 1801, 1815, 1805, (c) Death of Queen Elizabeth 1388, 1453, 1588, 1603 (d) Execution of Charles 1st 1646, 1649, 1651 (e) Pilgrim Fathers land in New England in 1600, 1620, 1625, (f) Lord Cornwallis becomes Governor General of India 1782, 1783, 1786, 1792 (g) French Revolution began 1783, 1789, 1795, 1799.

Ans. (a) 1914 (b) 1805 (c) 1603 (d) 1649 (e) 1620 (f) 1786 (g) 1789.

Q. 50. Name ten kings who have abdicated since 1936.

Ans. Kings who have abdicated their thrones since 1936 are :

- (i) Edward VIII of Britain.
- (ii) King Leopold of the Belgians.
- (iii) Queen Wilhelmina of Holland.
- (iv) King Michael of Rumania.
- (v) King Zog of Albania.
- (vi) Peter II of Yugoslavia.
- (vii) Simeon II of Bulgaria.
- (viii) Victor III of Italy.
- (ix) Umberto of Italy.
- (x) King Farouk of Egypt.

Q. 51. Write brief notes on

- (a) Balfour Declaration
- (b) Treaty of Versailles
- (c) American War of Independence
- (d) French Revolution
- (e) Asian Relations Conference
- (f) The North Atlantic Treaty
- (g) Integration of Indian States
- (h) Marshall Plan
- (i) Dumbarton Oak Conference

Ans. (a) **Balfour Declaration** Statement made by the British Government in Nov. 1917, promising that Palestine should be made a national home for the Jews, and will use its best endeavours to facilitate the achievement of the object, it being clearly understood that nothing shall be done which may prejudice the civil and religious rights of existing non-Jewish communities in Palestine or the rights and political status enjoyed by Jews in any other country.

(b) **Treaty of Versailles.** Treaty of peace concluded after termination of World War 1914-18 at Versailles in France on June 28, 1919 between the Allied and Associated Powers on the one

hand, and Germany on the other. Germany had to cede Alsace—Lorraine to France, some portions to Poland, Belgium, Denmark, Lithuania and Czechoslovakia, and had to disarm and reduce her land and naval forces. The Rhineland was to be occupied by the Allies for a period of fifteen years, the Saar territory and German rivers were to be internationalized. German colonies were to be administered by the Allies under the mandate of the League of Nations which was also created by this treaty. Germany was to recognize her sole guilt and make heavy reparations.

(c) **American War of Independence.** Struggle carried on by North American Colonists against the rule of England. It began in earnest in 1775 when Washington was chosen the commander-in-chief. In 1776 a Declaration of Independence was adopted. The war ended after the defeat of England at Yorktown in 1783, when England recognized the independence of the thirteen original colonies.

(d) **French Revolution.** A great upheaval in France towards the end of the 18th century brought about by heavy taxation and landowning system as well as the teachings of men like Rousseau. It began with the meeting in 1789 of the States General, later on called the National Assembly. A mob stormed the Bastille, and though the Assembly abolished feudal privileges and drew up a new constitution which Louis XVI accepted, the Monarchy was overthrown, and a National Convention was formed which declared France a Republic. Louis was executed and a Revolutionary Tribunal under Robespierre was established, to be overthrown in turn by a Directory, which maintained a middle course until Napoleon seized power in 1799 and became consul and ultimately Emperor.

(e) **Asian Relations Conference.** An unofficial and non-political conference of academic, cultural and other organizations of Asian countries, interested in the study and promotion of international relations held at New Delhi in March-April 1947. The conference was organised by the Indian Council of World Affairs, itself an unofficial and non-partisan body. The Conference discussed economic, social and cultural problems common to all Asian countries, most particularly (1) National movements for Freedom in Asia (2) Racial Problems and conflicts (3) Inter-Asian Migration (4) Transition from colonial to National Economy (5) Agricultural and Industrial development (6) Labour Problems and Social Services (7) Cultural Problems (8) Status and movements of Women in Asia.

(f) **The Atlantic Treaty.** A treaty of regional alliance by 12 North Atlantic nations (U. S. A., Canada, Great Britain, France, Belgium, Netherlands, Denmark, Sweden, Norway, Italy, Luxembourg and Portugal), signed at Washington on April 4, 1949. The agreement pledged the signatories to recognize "attack on one as attack on all, to consult together when their territorial integrity,

political independence or security was threatened in any part of the world and to eliminate conflict among themselves in the economic field." The pact consisted of 13 clauses and was valid in the first instance for ten years after which it could be renewed for another ten years.

(g) **Integration of Indian States.** When India became a dominion, paramountcy of the crown over the Indian States also lapsed. This was sure to create a great problem for the country as there was the fear of its getting Balkanized, if every prince, great or small, became independent and did what he liked. To guard against this the Political Department drew up an instrument of accession, acceptable to both the parties, and with the exception of Junagarh, Hyderabad and Kashmir, all the states acceded to the Union. This done, the late Sardar Patel started the process of the integration of the states. Three different processes were set at work each being applied on the merit of the case. (1) The first was the merger of the states in adjacent provinces, by which nearly 219 states were merged into them. (2) Next, a number of states were integrated forming bigger viable units and placed, like the governor's state, under Rajpramukhs as their constitutional heads. These states were Saurashtra, Greater Rajasthan, Madhya Bharat, Patiala and East Punjab States Union; Travancore-Cochin Union (3) The third category of states were the viable states of Hyderabad, Jammu, Kashmir and Mysore. (4) A number of small states were brought directly under the Centre to be governed by commissioners. The process of integration was thus brought to a successful completion.

(h) **The Marshall Plan.** Name also for the European Recovery Programme, initiated by General Marshall of U. S. A., by which economic aid to anti-communist governments of Europe was given, so as to enable them to recover from the disastrous effects of the 2nd World War, and for want of which they would have suffered economic crashes and gone Red. Austria, Belgium, Denmark, Eire, Greece, Iceland, Italy, Luxemburge, the Netherlands, Turkey, Britain and France accepted the offer and received the desired aid through a U. S. Government agency which administered the aid.

(i) **Dumbarton Oaks Conference.** A conference of representatives of Governments of Britain, U. S. A., Russia and China held at Dumbarton Oaks from August 21 to October 7, 1944, on the means of maintaining international peace and security on the conclusion of the World War then raging. This conference recommended the formation of 'The United Nations, defined its purpose and outlined its proposed organs, viz., the General Assembly, the Security Council, International Court of Justice and the Secretariat.

Q. 52. What important event in the Second World War happened on May 10th, June 6th, June 22nd, September 3rd, December 7th.

Ans. May 10th, 1940, Hitler invaded Holland's on June 6th 1944 the British and Americans landed in Normandy; June 22nd, 1941 Hitler attacked U. S. S. R.; September 3rd, 1939, Britain and Germany were at war; December 7th, 1941, Japanese attacked Americans at Pearl Harbour.

Q. 53. Name some important archaeological excavations in the nineteenth and twentieth centuries which added greatly to our knowledge of the ancient world.

Ans. (1) Those at Mohenjo Daro and Harappa, and Taxila in Sindh and the Punjab; (2) Lord Carnarvon and Howard Carter's finding of Tutankhamen's tomb and his mummy, in Egypt, in the "Valley of the Kings"; (3) Sir Arthur Evan's in Crete; (4) Schlieman's at Troy and Mycene; (5) Sir Leonard Wooley's at Ur, (6) Layard's at Nineveh, (7) Koldewey's at Babylon and (9) Garstang's at Jericho.

Q. 54. What events are celebrated on these dates? 26th January, July 4th, July 12th, July 14th, August 15th, November 5th, November 11th and December 3?

Ans. On 26th January India celebrates her Republic Day; on 4th July, signing of American Declaration of Independence on July on 12th, Battle of the Boyne in Ireland; on July 14th, storming of the Bastille in France; on August 15th, India celebrates her Independence-day, on November 5th, Gunpowder Plot; on Nov. 11th, Armistice of 1918; on Dec. 3rd Guru Govind Singh's Birthday.

Q. 55. From what events do Hindus, Christians, Jews, Mohammedans and the Chinese date their eras?

Ans. Hindus from the accession of Maharaja Vikramajit. The Vikram era starts about 57 years B. C.; Christians from the supposed date of the birth of Jesus Christ; Jews from the supposed date of the creation of the world, 3760 B. C.; Mohammedans from the flight of Mohammad from Mecca to Medina in 622 A. D.

Q. 56. What well known histories have been written by Edward Gibbon, Sir Percy Sykes, Kalhana, Herodotus, Thucydides, J. R. Green, Lord Macaulay, Livy, George Grote, H. T. Buckle, W. H. Prescott, J. A. Froude, T. Mommsen, J. L. Motley and Rhy David, Gilbert Burnett.

Ans. Edward Gibbon wrote: "The Rise, Decline and Fall of the Roman Empire"; Sir Percy Sykes: A History of Persia and Afghanistan; Kalhana "Rajtarangni" which is a history of Kashmir; Herodotus: History of Greece and Persia, but most specially the Greek-Persian struggle which culminated in the defeat of Persian invasion attempts in 490 and 480 B. C.; Thucydides:

"History of the Peloponnesian War"; Green : "A short history of the English People"; Lord Macaulay : "The History of England from the Accession of James II"; Livy : "History of Rome from the foundation to 9 B.C."; Grote : the History of Greece; H.T. Buckle: "The History of Civilization"; W. H. Prescott : "The History of My own Times"; Froude; The History of England in the reign of Henry VIII, Edward VI, Mary Tudor and Elizabeth; Mommsen : "The History of Rome"; Motley "The Rise of the Dutch Republic" and Rhy David "Buddhistic India"; Gilbert Burnet wrote the "History of the Reformation in England."

Q. 57. Write short notes on the following :—

The Middle Ages, The Renaissance, The Reformation, The Holy Roman Empire, Hohenzollern, the Hapsburg, the Abbassides, Afrika Korps.

Ans. The Middle Ages. The period of European History between the fall of the Roman Empire in 476 and the Renaissance of the 15th century. Its distinctive features were the unity of Western Empire within the Roman Catholic Church, and the feudal organization of political, social and economic relations.

The Renaissance. The revival of classical learning in 15th and 16th centuries in Europe. The movement in Italy started with a revival of the study of ancient models in the literature and art of Greece and Rome and spread to Germany and other countries. Emphasis on the potentialities of the individual and his life, a belief in the power of education to produce the "complete man", the desire to enlarge the bounds of learning and the growth of scepticism and free thought were among its most outstanding characteristics.

The Reformation. The movement which in the 16th century ended the religious unity of Western Europe and resulted in the establishment of the Protestant Churches. It was initiated by Martin Luther in 1517, who protested against the sale of indulgences and nailed to the Church door at Wittenberg his famous 95 theses.

Holy Roman Empire. Name applied to the empire of Charles the Great (Charlemagne) and his successors and to the German Empire (962-1806), both being regarded as a revival of the Roman Empire.

Hohenzollern. The German family which became Electors of Bradenburg in 1415, Kings of Prussia in 1701 and the Emperors of Germany in 1871. The last emperor William II abdicated in 1918, when Germany became a Republic.

Hapsburg. A famous royal house which played a leading part in the history of continental Europe, specially in that of Austria. Representatives of this House were the Imperial Crown of the Holy Roman Empire for centuries.

Abbassides. Dynasty of thirty-seven Caliphs, descended from Abbas the uncle of Mohamud, who ruled over the Muslim Empire from 750 to 1258. Haroun-al Rashid of the Arabian Night's fame was one of them.

Afrika Korps. The famous German military division in World War II, specially equipped for desert warfare. It fought under General Rommel, who was ultimately defeated at the decisive battle of El-Alamein, which proved the turning point of the Great War. In the last phase of the struggle the Korps entrenched itself in Tunisia, but as it could not hold for long, it surrendered in May 1943.

Q. 58. Who were the following historical or legendary figures ?

William Wallace, Chevalier de Bayard, Beyard of the East, Alexander of the North, the Persian Alexander, the English Alexander.

Ans. **William Wallace :** Scottish national hero associated with Robert Bruce, **Chevalier de Bayard.** A celebrated French knight and national hero, distinguished in the Italian campaigns of Charles VIII, Louis XII and Francois I ; **Bayard of the East** was Sir James Outram ; **Alexander of the North** was Charles XII of Sweden ; **The English Alexander** was Henry V of England.

Q. 59. Mention very briefly the political, historical and/or scientific importance of the following dates :—

1849

1871

1896

1905

1933

1950

Ans. In 1849 The Punjab was annexed by the British ; in 1871 William I of Prussia was proclaimed Emperor of Germany at Versailles ; In 1896 the great discovery of the X ray was made by Rontgen ; in 1905 the Russian fleet was destroyed by the Japanese and Asia awoke from its long slumber ; in 1933 Hitler became Chancellor of Germany ; in 1950 India became a Republic.

Q. 60. Write what you know about the following :—

(a) **Ferishta**

(b) **Thyagaraja**

(c) **Dayanand Saraswati**

(d) **Ignatius Loyola**

(e) **Ferdinand de Lesseps**

- (f) **Abraham Lincoln**
- (g) **Marco Polo**
- (h) **Lord Nelson**
- (i) **Florence Nightingale**
- (j) **Cleopatra**
- (k) **Charlie Chaplin**
- (l) **George Stephenson**
- (m) **Dr. Sun Yat Sen**

Ans. (a) **Ferhishta** whose full name was Mohammad Kasim Ferhishta was a Persian historian, born at Astrabad on the Black Sea. He came to India and lived at the courts of Ahmedabad and Bijapur. He wrote the *History of the Rise of the Mohommedan Power in India* which he finished in 1609.

(b) **Thyagaraja**. Great India saint and musician aptly called the Beethoven of South India. Born in a Telugu family in 1759, passed his life in Tiruvayyur on the banks of the Cauvery and died on January 6, 1847. His compositions are in more than 200 *ragas*. *Prahlad Bahktha*, *Vijayam* and *Nowka Charitram* both in Telugu, are some of his works.

(c) **Dayanand Saraswati**. Founder of the Arya Samaj. A great religious reformer; was a Brahmin by birth. Early in life he renounced idol worship and urged his countrymen to a return to the purer principles of the Vedas. He saved Hindu society from disintegration and its fast absorption into the Muslim and Christian faiths.

(d) **Ignatius Loyola**. Founder of the society of Jesus or Jesuits. At first he entered the army, but being severely wounded, gave it up and solemnly pledged himself to a life of devotion and service to the Church for which he organized an army and worked with so much single-minded zeal and devotion to the Cause, that he has become an immortal among the devoted servants of the Roman Church. Lived 1491-1556.

(e) **Ferdinand de Lesseps**. French engineer and diplomat. Famed for constructing the Suez Canal joining the Red Sea with the Mediterranean. He was also put in charge of the construction of the Panama Canal, but the scheme failed. Lived 1805-94.

(f) **Abraham Lincoln**. Sixteenth President of the United States, a great advocate of the abolition of slavery in the States. His election in 1860 was a signal for the secession of the Southern States. He refused to recognise the secession and fought a long and bitter war to bring those states in the Union. In 1863 he proclaimed the emancipation of the Negroes, but was assassinated the next year. Famous for his Gettysburg speech "Govt. of the

People, by the People, for the People shall not perish from this earth."

(g) **Marco Polo.** Great Venetian traveller whose accounts of his travels in the Far East, specially China, are world famous. These accounts introduced the Far East to Europe for the first time. Lived 1254-1324.

(h) **Lord Nelson.** Famous British admiral who rose from a mere captain to the command of the British navy in several decisive expeditions, which established his fame as a great naval commander. He fought against the Spaniards at Cape St. Vincent in 1797 ; against the French fleets at Aboukar Bay 1792 which he destroyed ; but the crowning feat of his life was the destruction of the combined fleet of Spain and France off Trafalgar, where he was mortally wounded. Lived 1758-1805.

(i) **Florence Nightingale.** English hospital reformer and nurse. Her fame rests on the great services she did in organising nursing in the Crimean War, specially during the terrible winter of 1854-55. She was the first to start a regular training college for nurses in England.

(j) **George Stephenson.** Famous British engineer who built the first locomotive in 1814 and as engineer to the Stockton and Darlington Railway built the world's first public locomotive in 1821. Lived from 1781-1848.

(k) **Dr. Sun Yat Sen.** Called the "Father of the Chinese Republic." He organised the Kuomintang party in 1905, which in 1911 brought about a revolution in the country and overthrew the Manchu dynasty and established a republic of which he was the first President. He died in 1925, but he has remained the symbol of Chinese awakening.

(l) **Cleopatra.** Queen of Egypt, celebrated for her ravishing beauty. She succeeded to the throne of her father in 51 B.C. Julius Caesar arrived in Egypt in 49 B.C. and she became his mistress and bore him a son and went with him to Rome. On Caesar's assassination, she returned to Egypt. In 47 B.C. Mark Antony was captivated by her, but after the loss of the battle of Actium killed herself by an asp.

(m) **Charlie Chaplin.** English-born American motion picture comedian ; one of the most well known film actors of the world. His best known films written and directed by him are : *The Gold Rush*, *City Lights*, *Modern Times*, *the Great Dictator* (a satire on Adolf Hitler), and *Monsieu Verdous*.

Q. 61. What was or is the title of ?—

(a) The Anglo-Saxon Kings who held supremacy over the rest of the Heptarchy. (b) The successors of Mohammad in temporal and spiritual powers. (c) The former Emperors of Russia. (d)

The rulers of the old Venetian Republic. (e) The title by which Benito Mussolini, fascist dictator of Italy, was known. (f) A Prince of the Holy Roman Empire entitled to take part in the election of the Emperor. (g) The official title of Adolf Hitler. (h) The Sultan as spiritual successor of Mohammad. (i) The sovereigns of Peru before its conquest by the Spaniards. (j) The emperors of Germany. (k) The rulers of the Tartars and the Mongols. (l) The priest-rulers of Tibet. (m) The rulers of Japan. (n) The Sultans of Turkey. (o) The governor of Turkey. (p) The King of Persia. (q) An Arab Chief. (r) The title conferred on Viceroy of Egypt by the Turkish Sultan.

Ans. (a) Bretwalda (b) Caliph (c) Czar (d) Doge (e) The Deuce (f) Elector (g) The Fuhrer (i.e. the Leader) (h) Imam (i) Inca (j) Kaiser (k) Khan (l) Lama (m) Micado (n) Padishah (o) Satrap (p) Shah (q) Sheikh (r) Khedive.

Q. 62. Mention briefly the events which have brought the following places into world news in recent months.

The Suez Canal, Abadan, Ismailia, Libya, Geneva.

Ans. The Suez Canal is the central pivot round which the Western powers wanted to build their bases for the Middle East Command, to serve them as a base for their forces, and for checking and meeting not only any threat to this area from the Soviet Union, if a war breaks out, but also in peace time as a strong point in the chain of strongholds the Western Powers are building around the Soviet Union and its satellites. The Egyptians regarded the stationing of foreign forces on their soil as a threat to their sovereign existence, and demanded the evacuation of the British forces stationed in this area. They therefore rejected the offer of the Western powers to have a say on a status of equality in the councils of the Middle East Command and an offer of help to train and equip their forces to bring them up to the standard of their allies. This absolute refusal was met on the British side by an equally adamant refusal to entertain any idea of evacuation of the canal zone. The intense agitation the Egyptians carried on against the British resulted in sporadic fighting which resulted in the loss of life on both sides, much heavier of course on the side of the Egyptians and this went on without any conciliation in sight. Ultimately the British were forced to withdraw totally from Egypt and thus Egypt became a sovereign republic with no foreign soldier on her soil.

Abadan. Abadan came all of a sudden in the world news, when the Government of Dr. Mossadeq, Premier of Persia, decided to nationalize the great Anglo-Iranian Oil Company at Abadan and bring the whole management, hitherto purely under the British, under his own officers, and keep the British only as technical hands or at best as advisers, but subordinate and answerable to officers appointed by the Persian government.

That meant that this biggest of the oil company of the world worth many a million pounds of income per year was to go all of a sudden out of the control of the British, both with loss of prestige, and the immense profit the company was bringing to the coffers of the British government, the shareholders and a large number of highly paid technical hands and the managing staff. The British government had been long trying to get favourable terms by which the Persian government would only get more royalties and nothing more, but as feeling ran very high in Persia, any government that showed moderation in turn met with bitter opposition, so much so that Dr. Razmara was assassinated because he showed a tendency against nationalization of the company. Dr. Mossadeq was prepared to risk a war rather than budge an inch from his resolve. As Mr. Attlees' government was not prepared to risk a war for the sake of an oil company, it ate the humble pie and let the British be driven out bag and baggage. The great Abadan refinery was closed down in consequence. Negotiations were then started with other companies notably the Americans and the Dutch and they came to terms acceptable to both sides.

Ismailia. Ismailia is a town near the Suez Canal in Egypt, where the first Egyptian martyrs of the dispute between the British and the Egyptians over the Suez Canal fell. The place saw much bitter fighting, but this remained locally confined to police action between the Egyptian police and the British military guarding the sweet water reservoir near by.

Libya or Tripolitania through the efforts of the U.N., got liberation from the British, who had been ruling it since the expulsion of the Italians in the 2nd World War. It has become an independent kingdom with Idris el Senussi, as its first king. This happy event took place towards the end of 1951 (Dec. 24, 1951).

Geneva : Historic capital of Switzerland where efforts for unification of North and South Korea, and cease fire in Indo-China were made by the U. S. A. and its U. N. allies in the recent Korean War on the one hand, and the U.S.S.R., China, the Viet Minh leaders on the other, and there was an amicable settlement of the problems.

Q. 63. (a) Under what act and in what year was provincial autonomy introduced in India ?

(b) During whose Governor-Generalship was the Pitt's India Act passed ?

(c) During whose viceroyalty did the partition of Bengal take place ? When was it rescinded ?

(d) When was Burma separated from India ? When did that country become a republic ?

(e) When and by whom was the Indian National Congress founded? What was the object of founding the Congress?

(f) When and in which city did the Indian National Congress declare "Purna Swaraj" as its ultimate objective?

(g) Which was the first British settlement in India?

(h) Who was the first Viceroy of India?

(i) Who was the first President of the U.S.A.?

(j) When were legislative councils first established in India?

(k) Who was the patriot who declared "Home rule is my birth right?"

(l) Name a famous German General of the 2nd World War. Who was the General who gave a crushing and decisive defeat to his armies? Also state where was his army so defeated.

(m) Where was "the scorched earth policy" used during the 2nd World War? What is that policy?

(n) What was the name of Mr. Churchill's father? Name one of his most distinguished ancestors.

Ans. (a) In 1937 under the Government of India Act 1935.

(b) In 1784 when Lord Hastings was the Governor General.

(c) The Partition of Bengal took place in 1905 during the viceroyalty of Lord Curzon. It was rescinded in 1911 by proclamation of King George V during the viceroyalty of Lord Hardinge.

(d) Burma was separated from India in 1937.

The Union of Burma came formally into existence on 4th January, 1948, when Sir Hubert Rance, the last British Governor, handed over authority to Sao Shive Thaik, the first President of Burma.

(e) The Indian National Congress was founded by Mr. Allan Octavian Hume in 1885. The object set in view was (1) The fusion into one national whole of all the different and discordant elements in India's population. (2) The gradual regeneration—mental, moral, social and political—of the nation thus evolved, and the consolidation of Union between England and India by securing the modification of such of the conditions as were injurious or unjust to the latter country.

(f) In 1926 on the banks of the river Ravi at Lahore.

(g) Surat.

(h) Lord Canning.

- (i) George Washington.
- (j) In 1919.
- (k) Bal Gangadhar Tilak.

(l) Rommel. General Montgomery defeated Rommel at Al Alamein.

(m) In the U.S.S.R. The object was to destroy everything which could be of any use to the enemy in the prosecution of his war.

(n) Mr. Randolph Churchill. His most illustrious ancestor was The Duke of Marlborough.

Q. 64. When were the following battles fought, who were the contesting parties, and who won? Answer with date, contestants and victor.

- (a) The second battle of Panipat
- (b) The Battle of the Golden Spurs
- (c) The Battle of Marston Moore
- (d) The battle of Plassey
- (e) The battle of Trafalgar
- (f) The battle of Chilianwala
- (g) The Battle of Omdurman
- (h) Battle of the Nile.

Ans. (a) Second battle of Panipat was fought in 1556 between the forces of Hemu and Akbar. The latter was successful.

(b) Battle of the Golden Spurs or the battle of Courtrai was fought in 1302 between the Flemings and the French. The latter were defeated.

(c) The battle of Marston Moore was fought in 1664 between the Royalist forces of Charles I led by Prince Rupert and the Parliamentary forces, also called the Ironsides, led by Oliver Cromwell. The latter was victorious.

(d) The battle of Plassey was fought in 1757 between the forces led by Clive and those of Siraj-ud-Daula. The latter was defeated.

(e) The battle of Trafalgar was fought in 1805 between the British and the combined French and Spanish fleet. The former were victorious.

(f) The battle of Chilianwala was fought in 1849 between the Sikhs and English. The latter were victorious.

(g) The battle of Omdurman was fought in 1898 between the Anglo-Egyptian army under Kitchner and the Khalifa, when the opposing forces of the Khalifa were routed.

(h) The battle of the Nile was fought in 1798 between the English and the French fleet, when the latter was defeated and destroyed.

Q. 65. State approximately when :—

(a) Homer flourished (b) Rome was founded (c) Zoroaster lived in Persia (d) The battle of Thermopylae took place (e) Persia was subjugated by Alexander the Great (f) Caesar invaded Britain (g) Alfred defeated the Danes at Ethandune (h) Joan of Arc was burnt at the stakes (i) Drake sailed round the World (j) England and Scotland were United (k) Charles I of England was executed.

Ans. (a) The time when Homer flourished has been conjecturally put at anywhere between the 12th and 9th centuries B.C. (b) Rome was founded in 753 B.C. (c) Zoroaster is supposed to have lived between 1000 and 500 B.C. (d) Battle of Thermopylae took place in 480 B.C. (e) Persia was subjugated by Alexander in 331 B.C. (f) Caesar invaded Britain in 55 B.C. (g) Alfred defeated the Danes at Athandune in 878 A.D. (h) Joan of Arc was burnt at the stakes in 1431 A.D. (i) Drake sailed round the world in 1577 (j) England and Scotland were united in 1603 (k) Charles 1st was executed in 1649.

Q. 66. Name :—

(a) The first Prime Minister of England.

(b) The British Prime Minister who died broken hearted on hearing the news of the defeat of the armies of Russia and Austria at Austerlitz.

(c) The Prime Minister who purchased shares in the Suez Canal for his country.

(d) The Prime Minister who disestablished the Church of Ireland.

(e) The Prime Minister who got the Irish Home Rule Bill passed.

(f) The Prime Minister who repealed the Corn laws.

(g) Name the British Prime Minister in (1) August 1914 (2) November 1918 (3) September 1939 (4) The present Prime Minister.

Ans. (a) Robert Walpole (b) William Pitt The Younger (c) Benjamin Disraeli, Earl Beaconsfield (d) Mr. Gladstone (e) Asquith (f) Peel (g) (1) Mr. Asquith (2) Mr. Lloyd George (3) Mr. Chamberlain (4) Mr. MacMillan.

Q. 67. (a) Name three Indian States which were under Muslim rule before India became a dominion and the years in which they acceded to the Indian Union.

(b) Three Indian States under the Marhatta rulers and the approximate dates of their accession to the Indian Union.

(c) The Indian States which joined to form the Greater Rajasthan.

(e) The states which are being directly governed by the Centre.

(b) Gwalior and Indore on 15th June 1949 when they joined in the Mahadya Bharat Union. Baroda merged in Bombay State on May 1st, 1949.

(d) Kolhapur, Rampur, Baroda, Tehri Garhwal, Cooch Behar.

(e) Himachal Pradesh, Delhi, Manipur, Tripura, Andaman and Nicobar Islands and Laccadive and Minicoy islands..

Ans. (1) The Crusaders were Christian warriors who fought in the wars undertaken between 1096-1291 to recover Palestine, the Holy Land, from the Moslems. They were soldiers coming from many countries of Europe and were led by various kings from time to time during these centuries.

(2) **The Troubadours** were a class of poets who flourished in Provence and South France from 11th to 13th centuries. Their songs were devoted mainly to themes of exalted love and idealization of women or glorifying their patrons. They were often men of birth and bore arms as knights.

(3) **The Lollards** were the early German reformers and the followers of Wycliff in England. They condemned Transubstantiation, advocated the diversion of ecclesiastical property to charitable uses, denounced war and capital punishment. As heretics they were often burned. During the 16th century they were ultimately absorbed in the Protestant movement.

(4) **The Jesuits** were a religious order, called also the "Society of Jesus", founded in 1534 by St Ignatius Loyola. This order was formed to combat the Reformation and to defend and propagate the Roman Catholic faith, and to carry on missionary work among the heathens. Loyola infused into the order military discipline and this character it retained throughout the centuries. The order achieved notable successes as missionaries in Japan, China, among the Red Indians and elsewhere. But the dubious political activities

of the order resulted in its expulsion from or suppression of its many activities, even so much so that Pope Clement XIV was forced to disown and suppress it.

(5) **The Holy League.** A combination formed by Pope Julius II in 1511 with Venice, Maximilian of Germany, Ferdinand III of Spain and various Italian princesses to drive the French out of Italy.

(6) **The Edicts of Nantes.** This was an edict issued by Henry IV of France in 1598 granting freedom of worship etc. to the Huguenots.

(7) **The Pilgrim Fathers** was the name given to the Puritans, about 100 in all, who sailed from England in the Mayflower in 1620 and settled in Massachusetts, U.S.A., to escape religious persecution.

(8) **Star Chamber.** "Tribunal consisting of members of the king's council which met in an apartment of Westminster Palace, which had a gilt starred ceiling. Under the Tudors it dealt with offenders strong enough to defy the ordinary courts, but under the Stuarts its sittings began to be very arbitrary and tyrannical, specially in suppressing the Puritans under Charles I. It was abolished in 1641.

(9) **"Rump" Parliament.** The English Parliament during the Protectorate. It was so called because it contained the Rump or Fag-end of the Long Parliament. It was this parliament that voted the trials of Charles I and was dismissed unceremoniously by Cromwell.

(10) **The Holy Alliance.** An Alliance of the sovereigns of Russia, Austria and Prussia, on the fall of Napoleon Bonaparte professedly to maintain the European *status quo* but really for the suppression of political liberty and the maintenance of absolute power.

Q. 69. Name the queens who have ruled England and the years between which they ruled. Name some outstanding military events in the reigns of two of them.

Ans. The first queen was Lady Jane Grey proclaimed queen in July 1553, but beheaded after a 14 days' reign; the next was Mary I (Bloody Mary) who wore the crown for five years (1553-51) and was succeeded by her half sister Queen Elizabeth I who ruled for 45 years (1558-1603). The next queen was Mary II, who, with her husband William III, reigned from 1689-1694. The next to succeed was Mary's younger sister Anne who ruled from 1702-1714; next was queen Victoria whose reign lasted from 1837-1901. Elizabeth II was proclaimed the queen of England in Feb. 1952, on the death of her father George VI.

We mention below outstanding military events in the reign of Queen Elizabeth I and Queen Victoria :—

Outstanding military event of Queen Elizabeth I was the defeat of the Spanish Armada.

Outstanding military events in the reign of Queen Victoria were the Indian Mutiny, The Crimean War, The Afghan, Sikh and Burmese Wars ; the Zulu and Boer Wars in South Africa ; the Boxer Rebellion in China ; and the campaigns in Egypt and Sudan, in the latter of which General Gordon lost his life.

Q. 70. State approximately when and in which countries do or did the following dynasties rule ?

(i) Manchu (ii) Sassanid (iii) Bourbons (iv) Tudors (v) Gupta (vi) Hapsburg (vii) Hohenzollern (viii) Safavi (ix) Mings (x) Windsor.

Ans. (i) *Manchus*—In China 1644-1912.

(ii) *Sassanid*—In Persia, modern Iran. From about 226 A.D. to about 633-51 when the Mohammedans conquered the country.

(iii) *Bourbons*—In France, Spain, Naples and several Italian duchies. The first Bourbon king of France was Henry IV who ascended the throne in 1589. In Spain the Bourbons came to power in 1700. The dynasty came to end in 1931.

(iv) *Tudors*—In England 1485-1603.

(v) *Gupta*—In India 320-480 A.D.

(vi) *Hapsburg*—In Austria 1238-1918.

(vii) *Hohenzollern*—In Germany and Rumania. In Germany from 1415-1918. In Rumania 1881-1947.

(viii) *Safavi*—In Persia 1499-1736.

(ix) *Mings*—In China 1368-1644.

(x) *Windsor*—In England 1910 to present day.

Q. 71. Name some of the most decisive battles of the world which in your opinion effected some great and prominent political changes.

Ans. 1. Battle of Marathon fought in 490 B.C., when Miltiades, the Greek general, with 10,000 Greeks, defeated 100,000 Persians under Darius and Artaphernes.

2. Battle of Arbela fought in 331 B.C., when Alexander the Great, overthrew Darius Codomanus (King Dara) for the third time.

3. Battle of Pharsalus fought between Julius Caesar and Pompey. This battle sounded the death knell of the tottering Republic of Rome and rendered also inevitable the establishment of the Roman Empire, with all its incalculable consequences for Europe.

4. **Battle of Chalons** when in 451 A.D. Actius and Theodoric utterly defeated Attila and saved Europe from devastation.

5. **Battle of Tours** in 732 A.D. when Charles Martel overthrew the Saracens under Abdul Rehman and thus turned for ever the advance of Muslim arms into Europe.

6. **Battle of Hastings** in 1066, when William of Normandy defeated Harold II and established the Norman dynasty in England.

7. **Battle of Peshawar.** Battle fought in 1008 between Mahmud of Ghazni and Raja Anangpal of Punjab in the plains of Peshawar in which the latter was defeated. This battle opened the flood gates of India to the successive waves of Muslim invaders into India. It demonstrated that India was very vulnerable from this side.

8. **Battle of Thanesar or 2nd Battle of Tarai** 1192, fought between Mohammad Ghori and Prithviraj Chauhan, in which the latter was killed. This battle established the Muslim empire in India.

9. **Battle of Orleans** in 1429, when Joan of Arc secured the independence of France.

10. **The defeat the Spanish Armada** in 1588 which freed England for ever from the Spanish yoke.

11. **Battle of Pultowa** (1709) when Peter the Great utterly defeated Charles XII of Sweden and established the Muscovite power.

12. **Battle of Waterloo** 1815 when Napoleon was defeated by the Duke of Wellington and Europe was restored to its normal condition.

13. **Battle of Alamein.** The most decisive battle of our time, which will go down as one of the most decisive battles of the world, fought Oct. 23,—Nov. 4, 1942, during the 2nd World War, when the British 8th Army under Montgomery completely routed the Axis (Germans and Italians) forces in the Western Desert of North Africa. That battle proved to be the turn of the tide against the Axis.

Q. 72. (a) Who wrote (1) Annals and Antiquities of Rajasthan (2) Harsh Charitra (3) Prithviraj Rasso (4) Mudrarakshasa (5) Tahqiq-i-Hind ?

(b) When and what was the reign of Terror.

(c) Who was the Terror of the World.

(d) Who was the last of the Saxons, the last of the Stuarts, the last of the Tribunes, the last of the Troubadours.

(e) Which is the Land of Bondage, the Land of Cakes, and the Land of Promise ?

(f) Who was the Napoleon of Oratory, the Napoleon of Peace, the little Napoleon ?

Ans. 1 (a) Annals and Antiquities of Rajasthan were written by Colonel Todd (2) Haish Charitra by Bana (3) Prithviraj Rasso by Chand Bardai (4) Mudra-rakshasha by Vaishkha Datta (5) Tahqiq-i-Hind by Alberuni.

(b) The Reign of Terror was the bloody period of the French Revolution between the fall of the Girondists and the overthrow of Robespierre. It lasted 420 days, from May, 31, 1793 to July 27, 1794. Thousands of Frenchmen were guillotined during these days.

(c) Attila, King of the Huns in the 5th century is called the Terror of the world.

(d) King Harold II, who was defeated and slain on the battlefield of Hastings is called the last of the Saxons ; Henry, Cardinal of York, the last legitimate male descendant of James 1st is called the last of the Stuarts ; Cola di Rienzi (1314-1354) who led the Roman people against the barons is called the last of the Tribunes ; Jacques Jasmin of Gascony (1798-1864) is called the last of the Troubadours.

(c) Land of Bondage : Egypt from the oppression of the Israelites there ; Scotland is the land of the Cakes ; Canan is the Land of Promise.

(f) Napoleon of oratory is Gladstone ; Napoleon of Peace is Louise Philippe (1773-1850) King of France ; Little Napoleon is Napoleon III.

Q. 73. Write four lines about the history of the following .

(a) Chanakya (Kautilya)

(b) Hiuen Tsang

(c) Kabir

(d) The Industrial Revolution in England

(e) The French Revolution.

Ans. (a) **Chanakya or Kautilya**, the famous author of the *Arthasastra* was the Brahman Prime Minister of Chandragupta Maurya, who helped his master to get the throne of Magadh. He is regarded as a very grasping but intelligent person. From his *Arthasastra* we know much about the administrative system of the ancient Aryans.

(b) **Heiun Tsang.** Great Chinese scholar and pilgrim who visited India during the time of Harsha to collect the Buddhist scriptures and visit the Buddhist holy places in India. We learn much about Harsha and India of those days from the writings of this famous traveller.

(c) **Kabir** lived about the end of the fourteenth century. He preached a religion of love, unity among all classes and creeds and salvation of the soul through devotional worship, together with its freedom from all insincerity, hypocrisy and cruelty. His *bhajans* are sung even today by the Hindi speaking masses of India.

(d) **The Industrial Revolution** is the name given to the social revolution in England during the 18th and early 19th centuries. This period marked a change from an agricultural and village England to the town and the machine age. It marked the rapid growth of its factories and towns and the replacement of the hand worker by the machine.

(e) **The French Revolution.** The great upheaval in France from 1789 to 1799 caused by the evils of the taxation and land owning system and the influence of Rousseau on the middle classes who demanded a greater share in the government. "Liberty, Equality, and Fraternity" were its slogans, and although the democratic institutions established during the revolutionary period received a set back by the emergence of Bonaparte as Emperor in 1799, the upheaval had world wide repercussions and can truly be called the harbinger of modern democracy.

Q. 74. Write very briefly in not more than four or five lines what you know about :

- (a) **The Inquisition.**
- (b) **Diet of Worms**
- (c) **The Habeas Corpus Act**
- (d) **The Reign of Terror**
- (e) **The Regulating Act**

Ans. (a) The Inquisition was a court established by Pope Gregory IX in 1235 to inquire into offences against the Roman Catholic religion. It became a terrible instrument in the hands of such courts as torture was mercilessly applied as a means of extracting recantations or evidence. Those found guilty were handed over to the secular authorities to deal with them according to the laws of the land. It flourished mostly in southern Europe. Though suppressed in France in 1772, it flourished in Spain upto 1820.

(b) **Diet of Worms.** This refers to the famous edict of 1521 which banished Luther and his followers.

(c) **Habeas Corpus Act.** This famous Act was first passed in England in 1679 in the reign of Charles II. According to this Act, a judge must issue a writ by which he directs a jailor to produce the prisoner in court in person, to certify the cause of imprisonment, thus preventing people being imprisoned on mere suspicion and making it illegal for one to be left in prison for an indefinite time without trial.

(d) **The Reign of Terror.** The period of French Revolution which lasted from the fall of Girondists on May 31, 1793 to the overthrow of Robespierre on July 27, 1794, during which thousands of supposed counter-revolutionaries were put to death by guillotines.

(e) **The Regulating Act.** Famous Act passed in 1773 by the British Parliament which introduced Parliamentary supervision over the East India Company and modified its constitution both in England and India. It remained in force from 1773 to 1784. One of its provisions was that the Government of Bengal was vested in a Governor-General and a council of four members. The votes of the majority were to prevail, the President having a casting vote in case of equality of votes. It did not work well, as it did not give absolute power to the Governor-General to override his counsellors.

Q. 75. What is the importance of the following dates in the national history of India ?

- | | |
|----------------|----------------------------|
| (a) 487 B. C. | (e) 1600 A. D. |
| (b) 325 B. C. | (f) 1630 A. D. |
| (c) 269 B. C. | (g) 1858 A. D. |
| (d) 1498 A. D. | (h) 1885 A. D. |
| (i) 1912 A. D. | (j) 15th August 1947 A. D. |

Ans. (a) In 487 B.C. Buddha passed away or achieved Nirvana.

(b) In 325 B. C. Alexander invaded India.

(c) In 269 B.C. the great Asoka ascended the throne.

(d) In 1498 Vasco da Gama came to India, having discovered the sea-route.

(e) In 1600, the East India Company was formed.

(f) In 1630 was born Sivaji, founder of the Marhatta Empire.

(g) In 1858 the British East India Company was dissolved and the Government of India was taken over by the British Crown.

(h) In 1885 the Indian National Congress was founded.

(i) In 1911 the seat of the Government of India was transferred from Calcutta to Delhi.

(j) On 15th of August, 1947 India became independent.

Q. 76. Answer the following :—

- (a) What is the "Adi Granth" ?, who composed it ?
- (b) Who was the rebel prince blessed by Guru Arjun ?
- (c) What were *Chauth* and *Sardeshmukhi* ?
- (d) What was the greatest achievement of *Shivaji* ?
- (e) During whose viceroyalty was the Ancient Monuments Preservation Act passed ? Name some of the historical places where important archeological discoveries have been made which have modified our views on ancient Indian history ?
- (f) What is the Wardha system of Basic Education ?
- (g) When did the Indian Congress lay down "*Purn Swaraj*" as its ultimate goal ?
- (h) When were introduced the Minto-Morley Reforms ?
- (i) When was the Servants of India Society founded ? Who was its founder ? What was the object of the Society.

Ans. (a) The "Adi Granth" is the first sacred scripture of the Sikhs. It was composed by the fifth Guru, Arjun Dev.

(b) Prince Khusrau.

(c) *Chauth* was one-fourth of the government revenue realized as a tribute from hostile or conquered territories by a military leader. It is usually associated with the Marhatta leaders.

Sardeshmukhi was an additional levy of ten per cent which *Shivaji*, the Marhatta chief, demanded on the basis of his claim as the hereditary *Sardeshmukh* (or chief headman) of Maharashtra.

(d) The greatest achievement of *Shivaji* was his welding of the Marhatta people, who were "scattered like atoms" through many Deccani kingdoms, into a mighty nation, in the teeth of opposition from the Mughuls, the Bijapur Kingdom, the Portuguese and the English and the Abyssinians of Janjira.

(e) (i) Lord Curzon (ii) Most important places where excavations of historical importance have taken place are :—

Taxila (in Rawalpindi Distt.) and Harappa (in Montgomery Distt.) of Punjab, and Mohenjo-daro Sindh now all in W. Pakistan ; Sanchi in Bhopal, Sarnath near Banaras, Patliputra and Nalanda in Bihar ; Nagarjunikonda in Madras, Paharpur, Bangad and Mahasthan in Bengal.

(f) This is a system of education which combines training in handicrafts with literary education.

(g) In the Congress session of 1926 at Lahore.

(h) In 1909.

(i) The Servants of India Society was founded in 1905 by Gokhale. Its object was to train "national missionaries for the service of India and to promote by all constitutional means, the true interests of the Indian people".

Q. 77. With what do you associate the following ?

- | | |
|-------------------------|--------------------|
| (a) Mahavira | (h) Cromwell |
| (b) Gautama Siddharatha | (i) Mussolini |
| (c) Charaka | (j) Lenin |
| (d) Kautilya | (k) Woodrow Wilson |
| (e) Manu | (l) Guru Nanak |
| (f) Karl Marx | (m) Todar Mall |
| (g) Abraham Linclon | (n) Bismark |
| | (o) Jinnah |

Ans.. (a) Mahavira with Jainism.

(b) Gautama Siddharatha with Buddhism.

(c) Charaka with surgery (His instruments were said to be so sharp, that he could split a hair in two).

(d) Kautilya with the Arthashastra and the court of Chandragupta Maurya.

(e) Manu with the famous Smriti (called the Code of Manu).

(f) Karl Marx with international revolutionary Socialism and Communism.

(g) Abraham Lincoln with the fight for the abolition of slavery in the U. S. A.

(h) Cromwell with the Civil War in England (which resulted in the execution of Charles I) and the establishment of the Commonwealth.

(i) Mussolini with Fascism In Italy.

(j) Lenin with the Russian Revolution which overthrew Czarism and established Bolshevism in Russia.

(k) Woodrow Wilson with his famous 14 points.

(l) Guru Nanak with Sikhism and the Bhakti movement.

(m) Todar Mall with Land Reforms and settlement in the Mughul India of Akbar's time.

(n) Bismark is associated with what is called "Blood and Iron's diplomacy and the establishment of the German empire in Europe.

(o) Jinnah with the creation of Pakistan.

Q. 78. Name the following :

(a) India's Ambassador to the U. S. A.

(b) High Commissioner for India in London.

- (c) **Commander-in-Chief of India.**
- (d) **Governor of Bombay.**
- (e) **Chief Minister of Madras.**
- (f) **VicePresident of India.**
- (g) **Captain of the Indian Cricket Team visiting England during 1952.**
- (h) **The dacoit of Saurashtra who was arrested in Pakistan.**
- (i) **India's permanent representative at the U. N. O.**
- (j) **Leader of the Indian Goodwill Mission to China.**
- (k) **Chairman Atomic Energy Commission India.**
- (l) **President Indian Science Congress.**
- (m) **Leader of the Communist Party in Parliament.**
- (n) **A film-star who is a member of the Council of States.**

Ans. (a) Mr. Chagla.

- (b) Mrs. Vijaylaxmi Pandit.
- (c) General Thimmaya.
- (d) Shri Sri Prakasha
- (e) Mr. K. Kamaraj Nadar.
- (f) Dr. Radha Krishnan.
- (g) Vijay Hazare,
- (h) Bhupat.
- (i) Shri Arthur Lal.
- (j) Shrimati Vijaylakshmi Pandit.
- (k) Dr. C. H. Bhaba.
- (l) Dr. S. L. Hora.
- (m) Mr. Gopalan.
- (n) Prithviraj

Q. 79. Name the following :

- (a) **Prime Minister of Ceylon.**
- (b) **Britain's Chancellor of the Exchequer.**
- (c) **Prime Minister of Japan.**
- (d) **Indian judge of the International Court of Justice who died soon after.**
- (e) **South Africa's Prime Minister.**
- (f) **The Ambassador of the U. S. A. in India.**
- (h) **President of the U. S. A.**

- (i) **King of Nepal.**
- (j) **President of Pakistan.**
- (k) **Capital of West Germany.**
- (l) **The place where 1958 Olympic games were held.**
- (m) **Ex. King of Egypt.**
- (n) **The place in Iran famous for its oil refinery.**
- (o) **The Allied Supreme Commander of Europe.**

Ans. (a) Mr. Bhadarnaike.

- (b) Heatcoat Amory.
- (c) Gen. Fazlollah Zahedi but now replaced.
- (d) Late Justice B. N. Rao.
- (e) Hendrik Verwerd.
- (f) Ellsworth Bunker.
- (g) Len Hutton.
- (h) Mr. Eisenhower.
- (i) King Mahendra.
- (j) Gen. Ayub Khan.
- (k) Bonn.
- (l) Melbourne.
- (m) Ex King Farouk.
- (n) Abadan.
- (o) Gen. Alfred M. Gruenther.

Q. 80. Write short notes on—

- | | |
|----------------------------|----------------------------|
| (a) Viet Minh | (f) Wafd |
| (b) Myochit | (g) Kuomintang |
| (c) Akali Dal | (h) Falangist |
| (d) Front Populaire | (i) Ahrars |
| (e) Khaksars | (j) Anjuman-i-Watan |

Ans. (a) Viet Minh. The nationalist party led by communist Dr. Ho Chi Minh in Indo-China. It fought hard both as guerillas and also as a regular army in the open to end the French regime and ultimately succeeded in winning freedom for North Vietnam.

(b) **Myochit** is the leading political party in Burma.

(c) **Akali Dal.** The leading political and religious body of the Sikhs, most active in the Punjab, under the leadership of Master Tara Singh. It was this party that drove out Mahants from Gurdwaras and has been dominating the Shiromani Gurdwara Prabandhak Committee, in charge of Sikh Gurdwaras.

(d) **Front Populaire** was the right wing party formed by General De-Gaule in France in 1946.

(e) **Khaksars**. A semi-military organization of the Muslims, founded by Allama-Mashraqi in Punjab, run exactly on the lines of R. S.S. among the Hindus. The Khaksars carried *belchas* on their shoulders as their sign.

(f) **Wafd**. Egyptian nationalist party formed during the World War (1914-18) and led by Zaghloul Pasha and after 1927 by Nahas Pasha. The party was responsible for intensive agitation against British control in Egypt. It was in power till the coup d'etat of Gen. Naguib, when King Farouq was driven out and this party was dissolved.

(g) **Kuomintang** (i. e. Nationalist People's Party). Nationalist party of China founded by Sun-Yat-Sen in 1894. The Party came to the forefront after the Revolution of 1912. Democratic government, an improved standard of living for the people and the recovery of the rights enjoyed by foreigners at the expense of the Chinese, were the three principal items of a programme left behind by Sun Yet Sen in his will. When in power under Chiang-kai-Shek it became extremely undemocratic, and set up a virtual dictatorship, and launched a reign of terror against the Left. Its last stronghold is in Formosa.

(h) **Falangist**. The fascist party of Spain. After assuming leadership of the party in 1937, Gen. Franco altered its name to Traditionalist Spanish Phalanx.

(i) **Ahrars**. A semi-nationalist party among the Muslims. Ata-ullah Shah Bukhari was the leader. The party leaders remained in Pakistan after partition. Not much has been heard of it since.

(j) **Anjuman-i-watan**. An organization of nationalist Muslims of Baluchistan. Abdul-Samad-Khan was its leader.

Q. 81. Discuss the contribution of the following to the making of India.

- | | |
|------------------|----------------|
| (i) Sardar Patel | (iii) Kautilya |
| (ii) Todar Mali | (iv) Peshwas |

Ans. (i) Sardar Patel. The greatest achievement to the credit of the late Sardar Patel, which has made him rank among the greatest builders and immortal figures in Indian history, is the integration of some 563 princely states, whose relations with the Dominion of India had been left undefined by the departing British. When the country was in the grip of communal madness, and many an ambitious prince was trying to fish in troubled waters to carve out personal empires, Sardar Patel set himself to work and with patience and dexterity, sometimes

using persuasion and sometimes the big stick, he produced a unified India, without a drop of blood being shed.

Another achievement to his credit is that as the Home Minister, he consolidated the police, the secret service and won the loyalty of the Civil Service, so that he left his country quite consolidated with a stable government.

(ii) **Todar Mall's** permanent contribution to the making of India was the system of land survey and assessment he started which consolidated the administration of Akbar, and brought regular income to the exchequer, and removed uncertainty of assessment to the ryats. This system was so well conceived and adapted to the needs of the country, that the English adopted it, with very few alterations as their own for their administrative purposes.

(iii) **Kautilya or Chanakya**, the Prime minister of Chandragupta Maurya is one of the immortal figures of ancient Indian history. It was he, who, by his clever strategems, helped his master to overthrow the Nandas, and gain an empire. Chandragupta thus became through him an instrument in founding the first greatest consolidated empire of India, which comprised the whole of northern India down to the Deccan, except the far south.

Next, it was on Kautilya's advice that the grand system of government and military organization was built by the Maurya emperor. Of this we have clear insight in Kautilya's famous *Arthashastra*.

(iv) **Peshwas**. Shivaji and his successors left a small kingdom ; it were the Peshwas who enhanced the power and prestige of the Marathas to a considerable degree and carved out a big empire out of the ruins of that of the Mughals. It were they who revived the idea of a native Hindu Empire, which should stand as a bulwark against all invaders and foreigners. It were the Peshwas who kept before them the ideal of *Hindu-Pad-Padshahi*, which aimed at uniting all Hindu chiefs under one flag, This would have been achieved had not the Marahattas lost the Third Battle of Panipat.

GEOGRAPHY

PAPERS SET IN VARIOUS COMPETITIVE EXAMINATIONS ON GEOGRAPHY

Q. 1. Write short notes, not exceeding six lines, about each of the following structures :—

- (a) The Pyramids of Egypt ; (b) The Great Wall of China ;
(c) The Tower of Victory at Chittor.

(Military College Exam. May, 1958)

Ans. (a) The Pyramids of Egypt. These are massive stone tombs built for the Pharaohs of Egypt mainly between 4000 to 2900 B.C. to protect their mummified bodies and the wealth buried with them from robbers.

They cover large square areas and either rise to a point or are sloping oblong. At Giza in Egypt is one such pyramid.

(b) The great wall of China. "This is a wall with towers and forts at intervals over 1,400 miles long, from 20 to 30 ft. high and 25 ft. broad, which separates China from Mongolia on the north and traverses high hills and deep valleys in its winding course. The wall was built by Emperor Shih Hwang Ti about 250 B.C. to keep out the northern barbarians.

(c) The Tower of Victory at Chittor. This is one of the most imposing of towers built by Rana Sangram Singh to commemorate his victories over the Muslim rulers of Malwa and Gujerat. It is famous like the Qutab Minar of Delhi.

Q. 2. Describe how rivers act as agents of denudation, transport and deposition of earth. Illustrate your answer by reference to an Indian river. (30 lines)

(Military College Exam. May 1958)

Ans. (a) Rivers play a great part in the denudation, transport and deposition of earth at great distances from their mouths. When there is a heavy downpour, as for example during the monsoon months when there is a great downpour on the slopes of the Himalayan hills and valleys, huge quantities of soil, dissolved in the running water, are carried down to the plains below. When the rivers are in spate this dissolved soil material does not get deposited on the river bed, but is carried far into the sea, where it gets deposited. The huge delta basins of the Ganga and the Nile rivers have formed in this manner.

When after the rains are over, the rivers get slow, they cannot carry the heavy load of the silt they bring with them and these they deposit at many places during their course. The land receiving fresh layers of soil gets dried up and the river thus changes its course leaving its old bed covered with soil and sand.

As a writer puts it, the average soil load for the Mississippi river of the U.S.A. is only 0.07% and the maximum is 0.8%. Nevertheless this represents an average of 340 million tons in suspension and 40 million tons dragged along the river's bottom, to which must be added 136 million tons of dissolved matter. The total of 516 million tons a year is equivalent to the removal of a layer a foot thick from the whole 12,500,000 sq. miles basin every 6000 years. These figures thus bear eloquent testimony to the fact that rivers are active agents in the denudation of the land. Our whole Gangetic plain has thus been formed with thick soil going several thousand feet deep by the soil the Ganga and its tributaries have brought down from the high slopes of the hills many of which you find now quite bare of soil.

Q. 3. (a) Explain, why daytime in India is longer in June than in December. (15 lines)

(b) Examine the essential conditions for rainfall in a region.
(Military College Exam. May 1958)

Ans. (a) If the axis of the earth was perpendicular to the plane of the earth's orbit, days and nights in all parts of the earth would be twelve hours in length all the year round, but since the axis has been calculated to be inclined $23\frac{1}{2}^{\circ}$ from the vertical and always points towards the North Star, this inclination is the cause of change of length of day and night during summer and winter. Now on March 21st of every year the tilt of the earth's axis is across the rays of the sun, i.e. the sun is exactly opposite the earth's equator, days and nights are equal throughout the world. From that day the tilted axis of the earth goes on pointing towards the sun in the northern half, while that of the southern half gets reversed. This means that after March 21, days in the northern hemisphere, in which our India lies, begin to get larger and nights shorter. This tilt gets completed by June 21st, so that in mid June the day is the longest and night the shortest. By Sep. 22, the days get of equal length again and now by December 22, the above conditions get reversed so that by December 22, the days are the shortest in India.

(b) The distribution of rainfall over the surface of the globe shows a marked relationship to the mean distribution of barometric pressure and the general flow of air. Thus high pressure areas over sub-tropical belts and polar regions correspond to dry masses. All the great deserts of the world, where precipitation is below 10 miles per annum lie in these regions, e.g., the Sahara desert, the

dry regions of Arabia, the Thar desert, the Nubian desert in the northern hemisphere, the Kalahari desert in South Africa and Australia lie in this region ; so are the polar regions quite dry. The well marked equatorial, and north and south temperate belts of low pressure correspond to relatively wet area. As the amount of water a given volume of air can hold nearly doubles for each rise of temperature of 18°F , so the rainfall is usually the greatest in the warmest regions. In order to become saturated with water vapour to a considerable depth, air must travel over a long stretch of ocean and therefore such air masses give a greater rainfall than those which have passed over land surfaces. Thus the monsoon winds after flowing over the Indian Ocean bring heavy rains to the Indian sub-continent, Burma, China and Japan.

It should also be noted that generally all those lands which are in the proximity of great ocean masses have more rainfall than lands far inside the continents in the same latitude. Thus the west regions with an average rainfall of 60 inches or more include the high lands in the west of Ireland, Great Britain, Norway, the north-west of Spain etc., where the rain-laden westerly winds blow directly against high lands which are more or less in proximity of the great Atlantic Ocean. On the other hand there is less than 20 inches rain over much of the north and east as well as in the east of Spain, in continental Russia and around the Caspian sea which are far removed from the Atlantic ocean or where winds of the Atlantic ocean do not prevail as in the east of Spain.

Similarly the Gobi in N.W. China is a rainless desert as the rain-laden winds do not reach here, while the east coast of China and Japan in proximity to the Pacific ocean receive heavy rainfall though they are in the same latitude as the Gobi desert.

Q. 4. What are the following ?—(3 lines)

The Great Bear, Rain gauge, Lake, Savana, Barometer, Estuary, Cape, Isotherm, Gulf Stream, Tributary.

(Military College Exam. May, 1958)

Ans. The Great Bear, also called the Ursa Major, is a constellation of the Northern hemisphere. It consists of seven bright stars, two of which are known as "the pointers", since a line joining them will, if produced, pass close to the celestial pole and the Star Polaris.

Rain Gauge: This is an instrument for measuring rainfall. It consists of a copper funnel, whose top has a fixed area, and whose neck fits into a bottle or cylindrical can. The funnel and can are then enclosed in a metal cylinder considerably taller than the funnel so as to retain the rain water as received. The measurement is made by pouring the collected rain water into a glass measure marked to represent hundredth of an inch.

Lake. A lake is a sheet of water formed in a depression of earth's surface. Examples : Great Lakes of North America.

Savana is a wide grassy tree-less plain equivalent to a pampa or a prairie or a steppe. It is lushy green in the rainy season, but otherwise it is devoid of much vegetation in the rest of the year.

Barometer. This is an instrument for measuring atmospheric pressure. The tube is graduated in inches and fractions ; 30 inches being regarded as normal pressure at sea level.

Estuary. An estuary is the outlet of a river where it meets the sea.

Cape. A cape is a head or point of land running into the sea. Example Cape of Good Hope.

Isotherms are lines drawn on a map joining up all those places where the temperature is the same.

Gulf stream. This is the great ocean current, about 50 miles broad, that issues from the Gulf of Mexico and flows along the coast of North America as far as New Foundland, and from there it turns in N.E. direction across the Atlantic, throwing out a branch which skirts Spain and Africa, while the main branch visits the shores of Britain and Europe right up to Iceland. It is the genial influence of this current that gives to Britain its warm and humid atmosphere.

Tributary is a stream that joins a big river of a country. Thus the Jamuna, Sone, Gandak, etc. are tributaries of the Ganga.

Q. 5. (a) Name the four States which have common boundaries with Orissa.

(b) What are the state languages of the following states ?

Kerala ; Mysore ; Bombay ; Rajasthan.

(c) What conditions of climate and soil are required for the cultivation of :—

Wheat, rice.

(d) Name two major river valley projects in India.

(e) The following two lists contain the names of places and their chief productions. Pair them off correctly.

Places :—Kashmir, Mysore, Nagpur, Panna, Travancore.

Products :—Diamonds, manganese, rubber, silk, wool.

(f) The following two lists contain the names of places and their small-scale industries. Pair them off correctly.

Places : Aligarh, Ambala, Jaipur, Kanpur, Moradabad, Tiruchirappalli.

Small-scale industries : Artistic brassware, cigars, ivory work, leather goods, locks, scientific apparatus.

(National Defence Academy Exam. 1958)

Ans. (a) West Bengal, Bihar, Madhya Pradesh, Andhra Pradesh.

- (b) Kerala : Malayalam
 Mysore : Kanarese
 Bombay : Marathi and Gujarati
 Rajasthan : Rajasthani, and western type of Hindi.

- (c) **Wheat** : It requires mostly dry clay soil, dry temperate climate with occasional rainfall, specially at the time of sowing.

[However it is adopted to widest range of climate conditions from Arctic Tundras to S. Africa.]

Rice : Grown mostly in warm tropical climate, subtropical climate, with good rainfall. Its ideal condition of growth is that 'head should be in sun, its feet in water.' It will grow in any type of soil where water supply is plentiful.

(d) Bhakhra Nangal multipurpose project of East Punjab and Damodar Valley project of West Bengal and Bihar.

- (e) **Kashmir** Wool
Mysore Silk
Nagpur Manganese (at Dongri Buzurg)
Panna Diamonds
Travancore Rubber
 (f) **Aligarh** Locks
Ambala Scientific apparatus
Jaipur Ivory work
Kanpur Leather goods
Moradabad Artistic brassware
Tiruchirappalli Cigars.

Q. 6. What has made the following places famous and where are they located ? :—

- (a) Sarnath (b) Mohenjo Daro (c) Sanchi (d) Bandung (e) Elephanta (f) Bermuda (g) Sindri (h) Nalanda (i) Cherrapunji (j) Rupkund.

(National Defence Academy Examination 1957)

Ans. (a) Sarnath. This place is about four miles from Banaras. This place is famous because here the Buddha delivered his first sermon after he became the "Enlightened one". Here also joined him his first five disciples. Here also stands the famous Asoka Pillar whose lion capital has been adopted by the Republic of India as the State Symbol.

(b) **Mohenjo Daro.** This place is in Sindh (Pakistan) on the Kotri Larkana branch of N.W. Railway. This place has become famous because excavations have revealed the pre-Aryan Indus civilization.

(c) **Sanchi.** This town is near Bhopal in M. P. This is famous on account of the Buddhist Mound built about 3rd century, B. C.

(d) **Bandung.** Town in Java (Indonesia). It has sprung into prominence because here was held the first inter Asian-African political conference in April 1955.

(e) **Elephanta.** It is an island in Bombay harbour. It is well-known for its wonderful cave sculptures, most important of which is the Trimurti.

(f) **Bermuda.** It is a British Crown Colony and is the largest of the 300 coral islands in W. Atlantic. It is a tourist resort noted for pleasant climate.

(g) **Sindri.** Town in Bihar, well-known for its great fertilizer factory.

(h) **Nalanda.** Place in Bihar near Patna. Famous for Buddhist University that flourished from fifth to 12th century A.D.

(i) **Cherrapunji.** It is the wettest place on earth, having the largest amount of rainfall in Assam.

(j) **Rupkund.** Lake in the Himalayas near Garhwal district. It sprang into prominence when discovery was made of large quantities of human bones here.

Q. 7. Attempt the following :—

- (a) Write down briefly in not more than 8 lines three reasons for supposing that the earth is not flat.
- (b) Name the states of the Deccan.
- (c) Mention in their correct order the three main processes through which cotton goes between plucking and sale as cloth.
- (d) Mention in their correct order three processes through which tea goes between plucking and packing.

(National Defence Academy Examination 1957)

- Ans.** (a) (i) The shadow of the earth on the moon, which makes the different phases of the moon is always round and not flat.
- (ii) The topmost of a ship coming into view from a distance is seen first, then as it approaches us we see its middle and last of all the hull. This observation is reversed when the ship is leaving the port. If the earth were flat, all the parts of the ship would be observed all at once. The observations recorded above are possible only if the earth is a round globe.
- (iii) If we sail round the earth, say exactly to the west on the same latitude from Colombo and following the same latitude on land masses by horse, train or foot,

we would reach back at Colombo on circumnavigating our earth. That would be possible only if the earth is round. This experiment can be performed with an aeroplane closely following the earth on the same latitude. The aeroplane will come back exactly to the same spot, showing that it has circled round a globe.

- (b) 1. Mysore.
2. Andhra Pradesh.
3. Kerala.
4. Madras State.
5. Bombay.

(c) 1. Cotton, after plucking is normally ginned at or near the cotton growing area. Ginning separates the fibre from the seed. After ginning, the cotton is compressed into hard pressed bales, sent to market, graded and either shipped or sent to a cotton factory.

2. **The spinning process.** First the hard pressed bales, after removing their steel bands and jute baggings are fed into opening machinery which loosens the cotton and removes the dirt. It is finally delivered in the form of a thick even layer rolled to a bar from which it can be fed into the card. The function of the card is to open the cotton completely, remove foreign matter and tangled hairs by passing the material between moving surfaces covered with steel wire points and delivering a soft, untwisted strand of loosely assembled fibres called a sliver. This sliver looking like a white rope is coiled round a tall can and is next transferred to a draw frame.

Six or eight slivers are next combined and drawn through successive rollers till fine strands are obtained. The next process is to spin the strands and lastly to weave them to form cloth.

(d) After the tea leaf has been plucked it is taken and transferred to baskets in which the leaf is picked over for removal of stalks and all extraneous matter and transferred to the factory for manufacture.

Next, the green leaf is subjected to sifting on large sieves and to mechanical action. The next process is of *fermentation* or oxidation by the spreading of the leaf in a cool humid atmosphere and then drying or firing in a machine where hot air is forced into a chamber through which the leaf passes. Last of all sorting is done, whereby the tea is sifted and if necessary cut into various grades.

Q. 8. (a) Where are any four of the following Indian Institutions ?

- (i) The Central Building Institute.
- (ii) The Central Fuel Research Institute.
- (iii) The Central Leather Research Institute.
- (iv) The Indian Agricultural Research Institute.
- (v) The Indian School of Mines and Applied Geology.
- (vi) The National Chemical Laboratory.
- (vii) The Tata Institute of Fundamental Research.
- (viii) The National Physical Laboratory.
- (ix) The Bose Research Institute.

(b) From the following two lists choose any pairs of the correct place and product :

PLACE : Bundi, Ludhiana, Bangalore, Ahmedabad, Kolar, Hazaribagh district, Singbhum district, Digboi.

PRODUCT : Oil, iron ore, gold, mica, telephones, cotton textile, hosiery and knitwear, cement.

(c) Answer any four of the following :—

- (i) Name the best known game fish of the rivers of Kashmir.
- (ii) Name the best known game fish of the rivers of the upper Gangetic plain and the foothills of the Himalayas.
- (iii) Which of the following animals is or are carnivorous ? Elephant, camel, panther, wildbear, chita and monkey.
- (iv) What do we call a bird that spends part of the year in one part of the world and part in another ?
- (v) What birds visit northern India in great numbers during the winter ?
- (vi) What Indian timber was extensively used for ship-building in the days of wooden ships ?
- (vii) What do we call plants whose seeds are ground to flour and eaten by man ?
- (viii) What special property have leguminous plants ?
- (ix) Name the stage in the life of an insect between the larva and the imago.

(National Defence Academy Examination 1957)

Ans. (a) (i) Roorkee,
(ii) Dhanbad,

- (iii) Madras,
- (iv) New Delhi,
- (v) Dhanbad,
- (vi) Poona,
- (vii) Bombay,
- (viii) New Delhi,
- (ix) Calcutta.

[Note—For different institutes in the country consult Dr. Bhatnagar's Hand Book of General Knowledge.]

- (b) *Bundi*. Cement.
- Ludhiana*. Hosiery and knitwear.
- Bangalore*. Telephones.
- Ahmedabad*. Cotton textiles.
- Kolar*. Gold.
- Hazaribagh district*. Mica.
- Singbhum district*. Iron ore.
- Digboi*. Oil.

[For questions of this type consult Bharat Year Book.]

- (c) (i) Trout,
- (ii) Rahu,
- (iii) Panther and Chita,
- (iv) Migratory,
- (v) The crow,
- (vi) Teak,
- (vii) Cereals,
- (viii) The leguminous plants have great food value, which is largely due to a protein, known as legumin, found in the seeds, which grow in their symmetrical pods.
- (ix) The stage between the larva and the imago (i. e., adult) is that of the pupa.

Q. 9. Give the names of the reorganized States of India and of the Head of each State, and mention the centrally administered territories.

Ans. The following are the new reorganized States of India with the heads of Government of each State.

1. **Andhra Pradesh** : Bhim Sain Sacchar.
2. **Assam** : Fazl Ali.
3. **Bihar** : Dr. Zakir Hussain.
4. **Bombay** : Sri Prakasha.
5. **E. Punjab** : N. V. Gadgil.

6. Kerala : B. Rama Rao.
7. Jammu and Kashmir : Yuvraj Karan Singh.
8. Madhya Pradesh : H. V. Pataskar.
9. Madras : It was Mr. A. T. John when the paper was set (He has recently died).
10. Mysore : Shri Jaya Chamraja Wadyar Bahadur.
11. Rajasthan : Gurmukh Nihal Singh.
12. Uttar Pradesh : V. V. Giri.
13. West Bengal : Miss Padmaja Naidu.
14. Orissa : Y. N. Sukthankar.

Centrally administered States.

(1) Delhi (2) Himachal Pradesh (3) Manipur (4) Tripura
(5) Andaman and Nicobar islands (6) Laccadive, Amendive and Minicoy islands.

Q. 10. Name the Indian town in which each of the following is located :—

- (a) National Defence Academy.
- (b) The Headquarters of the Western Command.
- (c) Air Force Academy.
- (d) Defence Services Staff College.
- (e) The biggest Fertilizer Factory.
- (f) Hindustan Air Craft Factory.
- (g) Locomotive Work.
- (h) Railway Coach Factory.
- (i) Penicillin Factory.
- (j) Hindustan Shipyard.
- (k) The Tata Iron and Steel Works.
- (l) The National Stadium.
- (m) Forest Research Institute.
- (n) Indian School of Mines.

(Military College Examination 1957)

Ans. (a) Khadakvasla.

(b) Poona.

(c) Begumpet No. 1, Jodhpur No. 2 and Coimbatore (for officers)

(d) Wellington (South India).

(e) Sindri.

(f) Bangalore.

(g) Chittaranjan and Asansol.

- (h) Perambur.
- (i) Pimpri.
- (j) Vishakhapatnam.
- (k) Jamshedpur.
- (l) Delhi.
- (m) Dehra Dun.
- (n) Dhanbad.

Q. 11. Write short notes on any five of the following (3 or 4 lines each) :—

- (a) Kangaroo.
- (b) Rubber.
- (c) Prairies.
- (d) Yak.
- (e) Canton.
- (f) Trans-Siberian Railway.
- (g) Sargossa Sea.
- (h) Graft.

(Military College Examination 1957)

Ans. (a) Kangaroo is a vegetarian animal of Australia. The front limbs are small, while the hind limbs are long and powerful and allow the animal to leap swiftly over the ground. It has a pouch in its belly for its young.

(b) Rubber is the dried juice or secretion of various tropical plants where rain is abundant. Its elasticity, toughness, impermeability, adhesiveness and electrical resistance makes it useful as adhesive, coating fibre, and as a molding compound and electrical insulator. Extensively used as rubber tyres.

(c) Prairies are level grass covered treeless plains of U. S. A. and Canada.

(d) Yak. It is a kind of ox found wild in the plateau of Tibet. It has long black hair. When domesticated it yields milk, butter, meat etc. Its hair is spun into tent coverings and cloth.

(e) Canton is a city of South China on Canton river. It is one of the most flourishing of ports and had formerly extensive trade with Europe. It is a great manufacturing centre also.

(f) Trans-Siberian Railway. This railway in Siberia is the sole E. to W. transport artery in this territory of the U. S. S. R. It is the longest railway line in the world being fully 6,000 miles long. It connects Moscow with Vladivastok port in the far east part of the U. S. S. R.

(g) The Sargossa Sea is an area of still water in the north Atlantic, N.E. of the West Indies. It is largely covered with sea weed.

(h) **Graft.** This term means (1) the method of joining parts of two plants so that the tissues grow together, becoming one (2) in plastic surgery human skin, bone etc. may be successfully grafted one to the other if the tissues are compatible.

Q. 12 Into what zones can Russia be divided according to climate and vegetation? Give characteristic products of each (about 15 lines).

(Military College Exam. 1957)

Ans. Due to its vast area Russia (and for that matter the U.S.S.R.) has a vast range of climate. It may however for purpose of describing its climate be divided into the following four broad regions—

1. The European Plain, 2. Western Siberian Basin, 3. The Turanian Basin or Soviet Central Asia, 4. Eastern Siberia.

1. This region is affected in the N.W. by the warm Gulf stream and by Atlantic cyclones in the W. & N. W. bringing storms, clouds and changeable weather. It is fairly hot in summer but extremely cold in winter.

2. In this region winters grow longer and more severe, spring comes late and summers are short.

3. This region is open to cold north winds. Winters are extremely cold and summers are the hottest. Rainfall is very scanty.

4. Extremist continental climate in this vast area. Generally it is the coldest part of Russia. Winter is extremely cold falling as low as -58°F . at Verkhoyansk, but summer is fairly hot. July temperature at Verkhoyansk reaches 60°F .

Vegetation. It may be divided into five main regions.

1. Tundra 2. Forest 3. Steppe 4. Semi-desert 5. Desert.

1. In the Tundra only mosses and lichens grow.

2. Vast areas, specially the greater part of Siberia are covered with forest. The chief trees are spruce, pine, larch, white fir and cedar.

3. The steppes are to the south of the forest zone. They are treeless except in river valleys.

4. The Semi Desert and Desert areas. These lie chiefly between the Kazakhistan hills and mountains to the south.

The best portion is the region round the Crimea where extensive wheat fields are situated.

Q. 13. What do you understand from the 'mountain' the 'plain' and the 'delta' stages of a river? Illustrate your answer by reference to some Indian river. What class of river cannot form a delta? (about 20 lines.)

(Military College Exam. 1957)

Ans. In the first or the "mountain" stage, a river is formed by melting of a glacier, as the sacred Ganga issues from the Gangotri glacier at a height of 13,800 ft. in the Himalayas. Coming from a great height the river is swift and has many cataracts and passes through many narrow gorges which it has cut deep in course of time. It brings with it large boulders and small pebbles which it has repeatedly cut and rounded by continuous concussions among the pebbles themselves and the resulting sand. When there are heavy rains it is very turbid and carries much silt with it. It is also joined by other small streams that flow from adjoining river valleys. Thus the Ganga is joined by the Ghagra, the Gandak, the Kosi, the Son, Beit etc.

The swift flowing mountain torrent that a river is, is checked abruptly as it emerges from the hills and spreads out over a shallow bed. The Ganges is thus checked this way as it emerges from the Siwalik range on the plain at Hardwar and spreads out over a shallow bed more than a mile wide. When there are no rains the river flows smoothly in its course and is clear of all silt, but during the monsoon season, the huge silt it carries is spread over the vast dead level plain, which it floods. The vast alluvial Gangetic plain has thus been formed by the heavy mud brought to the plains by the main river and its tributaries.

Near its mouth, as it is about to pour its water into the ocean, the silt is deposited and this forms a big delta. It is about 200 miles in the case of the Ganga.

A delta is formed when the speed of a river current falls on meeting the still waters of a lake, a sea or the ocean, for the latter cannot carry away to a great distance the heavy silt the river has brought and which therefore falls down as a precipitate.

A delta on a river is not formed if the current is swift and the silt is very small or when the ocean into which it falls has very heavy tides, which carry the silt far away.

Q. 14. What are the following ? (3 or 4 lines each)

- | | |
|-------------------------|-------------------|
| (a) Phases of the moon | (f) Snow line |
| (b) Tides | (g) Frost |
| (c) Geysers | (h) Trade winds |
| (d) Eclipse of the moon | (i) Belt of calms |
| (e) Artesian well | |

(Military College Exam. 1957)

Ans. (a) If we were to watch the moon night after night we would see it assuming different shapes, sometimes it is a crescent, then a half moon and after a few days the full moon and then it again begins to wane till it becomes a crescent and then almost disappears. These are called the phases of the moon.

(b) Tides are the movement of waters of oceans caused by the single or combined attractions of the moon and the sun.

(c) **Geysers** are geological formations from which hot water and steam erupt explosively, usually at fairly regular intervals. Deep under-ground water under considerable pressure is heated by underground rock and this comes out at intervals to the surface.

(d) **Eclipse of the Moon.** If the moon passes into the shadow cast by the earth intercepting the light of the sun, an eclipse of the moon occurs. As the moon is a dark body like the earth, it shines by reflecting part of the light of the sun, hence when the earth intercepts this light the moon is eclipsed.

(e) **Artesian well.** It is a well sunk into permeable stratum which has impervious strata above and below it. The water percolates into the permeable strata from places higher than the place at which the well is sunk. The water in the well comes out by hydrostatic pressure.

(f) **Snow lines** is the line in a mountain above which snow remains perpetually on the mountain.

(g) **Frost.** When the climatic condition is such that the temperature of the atmosphere falls below 32° F, the water on the earth's surface, plant juices etc., freeze. It is then frost.

(h) **Trade winds** are winds which blow almost continuously in the tropical seas. North of the Equator they have a south-westerly direction and are called N.E. winds while south of the Equator they blow towards the N. W. and are called the S.E. winds. The Monsoons are trade winds.

(i) **Belt of calms** This region, also called the doldrum, is the region of calm weather at sea, just north of the equator on the confines of the trade winds. These calms last for weeks at a time.

Q. 15. Name a river valley project or major power project or community project in each of the five zones into which the country has been divided after the reorganization of States, and write brief notes on any two of these projects.

(Your answer should be in about 20 lines.)

(Indian Administrative Service Exam. 1957)

Ans. The following are the river valley projects in each of the five zones into which the country has been divided.

1. **Northern Zone :** Bhakra-Nangal dam project.
2. **Western Zone :** The Koyana hydro-electric-cum-irrigation project.
3. **Eastern Zone :** Damodar Valley project.
4. **Central Zone :** Chambal Valley project.
5. **Southern Zone :** Tungabhadra project.

The Bhakra-Nangal dam project is across a gorge in the river Sutlej in East Punjab. It comprises a 680 ft. high straight gravity

structure of cement and concrete across the gorge. It will make a lake spread over an area of 38,000 acres and will store some 35 million acre-ft. of water. The irrigation system will command an area of 6.6 million acres through 200 miles of lined canals and a network of distributaries. It will irrigate areas in E.P., Delhi and Rajasthan. Power Projects are being built at Nangal to supply electricity to all the three states. More will be built at Bhakra when the dam is complete.

(b) The Tungabhadra Project is near the confluence of the rivers Tunga and Bhadra in Andhra state. The dam is $1\frac{1}{2}$ miles long and 160 ft. high covering an area of 52 sq. miles. It is expected to produce 155,000 k. w. of electricity and provide 210,000 tons of foodgrains to the irrigation area.

Q. 16. Comment on the importance of the following :

(Your answer to each part should be in about 5 lines).

- (a) Rajgir.
- (b) Vijayanagar.
- (c) Chitor.
- (d) Chitaranjan.
- (e) Wardha.
- (f) Puri.
- (g) Pondicherry.
- (h) Kandla.
- (i) Avadi.
- (j) Ujjain.

(Indian Administrative Service Exam. 1957)

Ans. (a) Rajgir in Bihar State is a place of health resort, having a number of hot springs containing valuable mineral properties. It is also a great Buddhist pilgrim centre, for here the Buddha used to preach Buddhism. A Buddhist Council was held here after the death of the Buddha.

(b) **Vijayanagar.** Vijayanagar was the capital of the great Hindu kingdom of the South that fell to pieces on its defeat at Talikota in 1565. The site of the ruined city is now represented by Hampi.

(c) **Chitor** was the ancient capital of former Udaipur state. It has a great historical background, for every stone of it has some tale of heroism or romance to tell. Has the famous Tower of Victory built by Rana Kumbha.

(d) **Chittaranjan** in West Bengal has sprung into prominence as it contains the newly built Indian Railway Locomotive Manufacturing Workshops.

(e) **Wardha** is a town in Madhya Pradesh. It sprang into fame when Mahatma Gandhi began to live here. Wardha scheme of education originated here.

(f) **Puri** in Orissa is one of four sacred towns of the Hindus. The huge temple of Lord Jagannath attracts thousands of pilgrims every year. The world famous Car-festival is held every year in June-July.

(g) **Pondicherry** is a port in the Madras state. It was the capital of the French settlement in India founded in 1683. Its transfer to the Government of India saw the end of the French power in India.

(h) **Kandla** is a seaport in Gujarat port of the Bombay state. It is being developed into a major port to off set the loss of Karachi to India. It will serve its hinterland, i. e., Gujarat, Rajasthan, U. P., Punjab and Kashmir etc.

(i) **Avadi** (near Madras) sprang into prominence when the socialistic pattern of society resolution was passed here in the Congress session held in January 1955 under its resolution headed "Economic Policy." This resolution was moved by Prime Minister Nehru himself.

(j) **Ujjain** in Madhya Pradesh is an ancient city whose history goes back to well over 2000 years. It was the capital of the famous King Vikramaditya the Great who had the "Navaratna" or nine gems in his court, among whom Kalidas, the greatest Indian poet was one. A Kumbh Mela is held here every twelfth year. It also contains the famous Mahakaleshwar temple.

Q. 17. Why have the following figured recently as important news items ? Write about 4 lines on each.

Cyprus, Rupkund, Ahmedabad, Naharkatya and Ajnar.

**(Indian Administrative Services (Special Recruitment)
Examination 1956)**

Ans. Cyprus. This island in East Mediterranean has been filling headlines because of many riots there, and a strong agitation carried on by Gypriot Greek terrorist organization, called Eoka for a union or Enosis with Greece.

Rupkund. This is a small lake in the Himalayas part of the Garhwal district of U. P. In 1955 there were found on its shores a number of human skulls and bones, bunches of human hair and many articles. There have been made many surmises as to how these happened to be there. Some have suggested that they are the remains of Zorawar Singhs' army, others that they are the remains of a party of pilgrims, but nothing definite has been established as yet. A number of expeditions have gone to the lake to make researches on the spot.

Ahmedabad. The city came into the news when violent agitation against Gujarat being merged with the state of Bombay and the greater Bombay state was created. This agitation was created by persons who demanded the Maha Gujarat State. There were riots and arson and damage to public property. Public leaders were insulted and hooted, till Mr. Morarji Desai, then Prime Minister of Bombay decided to fast till he was dispassionately heard by his opponents. The violent type of agitation at last died down.

Naharkatya. This obscure place in Assam has come to the lime light because oil has been struck in its vicinity. The Assam Oil Company will exploit the oil jointly with the Government of India.

Anjar. This place recently came into the news when a severe earthquake rocked Saurashtra and much damage to life and property was the result.

Q. 18. Name

- (a) four great industrial towns in India
- (b) four ports on the west coast of India
- (c) four river valley projects in India
- (d) four national laboratories in India, stating the places where they are situated
- (e) four great wonders of the world.

(Indian Administrative Services Examination (Special Recruitment) 1956)

Ans. (a) Bombay, Calcutta, Ahmedabad, Kanpur.

(b) Surat, Bombay, Goa, Cochin.

(c) Bhakra-Nangal Dam project in East Punjab, The Damodar Valley project in Bihar and West Bengal, The Hirakud Dam project in Orissa, The Chambal Valley project in Madhya Pradesh and Rajputana.

(d) Central Drug Laboratory, Chittaranjan Avenue, Calcutta, National Physical Laboratory, New Delhi, National Chemical Laboratory, Poona, National Metallurgical Laboratory, Jamshedpur.

(e) The pyramids of Egypt, The Temple of Diana at Epheasus in Rome, The Hanging Garden of Babylon, The Statue of Jupiter at Olympia (Greece).

Q. 19. Explain briefly the following terms :—

A. (a) Antipodes (b) Doldrums (c) Fauna (d) Flora (e) Gulf Stream (f) Iceberg (g) Oasis (h) Solar System (i) Tides (j) Zenith.

B. Give a brief estimate of the mineral resources of India.

(Indian Administrative Services Examination 1955)

Ans. (a) Antipodes. This term stands for two places situated

on opposite sides of the earth, so that a straight line drawn through the earth from one to the other passes through the earth's centre. Thus London is antipode to the Antipode Island near south-east of New Zealand.

(b) **Doldrums.** Doldrums is the equatorial belt of low atmospheric pressure where the North-East and South-East trade winds converge and meet each other producing calms and light surface winds and a strong upward movement of air. Thus in spite of the calms and light winds, the doldrums are characterized by turbulent and stormy weather, with heavy rains, thunderstorms and squalls.

(c) **Fauna.** The animal life of a region or of a period is collectively designated as *Fauna*.

(d) **Flora.** The plant life of a region or period is collectively designated as *Flora*.

(e) **Gulf Stream,** also called "a river in the sea", is the largest and best known of ocean currents that starts from the Gulf of Mexico, and going along the east coast of North America passes over the Atlantic to Western Europe and Scandinavia. It is this current which is responsible for the mild climate of the countries it visits and keeps their ports free from ice during winter.

(f) **Oasis.** This is an area of fertile land amidst a desert, due to the presence of water there, e.g., a spring or springs or a stream may be flowing down a mountain side there.

(h) **Solar System.** This is the group of celestial bodies consisting of the sun and the planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto) that revolve around it. It contains also asteroids, comets, meteors and meteorites and the satellites that revolve round it.

(i) **Tides.** The alternate rise and fall of the surface of seas and oceans, nearly twice a day, caused by the gravitational pull of the moon and to some extent that of the sun is called tides.

(j) **Zenith.** That point in the heavens (i. e., the celestial sphere) which is vertically above the observer.

Q. 20. (a) What are the following and how do they get into the news ?

(i) Bikini (ii) Geneva (iii) Colombo (iv) Trieste (v) Seoul (vi) Formosa (vii) Israel (viii) Nairobi (ix) Hrakud (x) Ajanta.

(b) Write short notes on the following :—

(i) Soil of India (ii) Forests of India (iii) Fisheries of India.

(c) Give a short account of the five leading manufacturing industries of India.

(Indian Administrative Services Examination 1954)

Ans. (a) (i) Bikini is an uninhabited atoll comprising 36 islets in the Central Pacific. It is one of the Marshall islands.

It has been in the world news on account of the U. S. atomic tests made here.

(ii) **Geneva.** Capital of Geneva Canton in S. W. Switzerland. It is the headquarters of International Red Cross Society. It was also the headquarter of the defunct League of Nations and is still that of the I. L. O. It got into world news in 1954, when it became the venue for the conference, known as the Geneva Conference which arranged for a cease-fire in Indo-China.

(iii) **Colombo** is the capital of Ceylon. The Colombo Conferences of mutual aid to underdeveloped Asian countries have been frequently held here. One of such Conferences was the Premiers' Conference in 1954.

(iv) **Trieste** is a major port at the head of the Adriatic. It has been a bone of contention between Italy and Yugoslavia. Tempers were so much frayed over it in 1954 that a clash of arms was threatened, when announcement was made that the British and U. S. occupational forces would be withdrawn and the Free Port handed over to Italy. At last, an amicable settlement was arrived at between the parties.

(v) **Seoul** capital of South Korea came into world news when the North Koreans captured this city in 1950, in their southward drive to over-run and occupy South Korea.

(vi) **Formosa** is an island off the South-East coast of China, to where the Nationalist Government of Chiang Kai Shek fled and which has now become its headquarters. It has been incessantly in the world news because of the claim made on it by the Communist government of the mainland and its efforts to take it by force. The U.S.A. as ally and defender of Formosa has threatened dire consequences to China, should it try to invade the island.

(vii) **Israel** is the newly created state of the Jews, carved out of Palestine. It often occupies news headlines because of sporadic clashes between the Jewish troops defending the borders and the neighbouring Arab states that would pounce upon it if they had the power to do so.

(viii) **Nairobi** is the capital of Kenya, a Crown Colony in East Africa. It has been often in the news on account of the terrorist Mau Mau movement started by the Kikuyu tribe against the oppressive regime of the Whites.

(ix) **Hirakud** is a dam project to develop the Mahanadi valley. It has been constructed about 9 miles above Sambhalpur in Orissa. It will provide irrigation to over 1.9 million acres of land and generate 200,000 k. w. of electricity. The news about the work done on the project has often been coming in the news specially for the power it may supply to the Rourekala steel plant.

(x) **Ajanta** is a village near Aurangabad in former Hyderabad State (Deccan) famous for the caves consisting of monasteries and temples. Nowhere else in the country is there such an admirable combination of architecture, paintings and sculpture. It attracts tourists from all over the world.

(b) (i) The soils of India may be divided into three main divisions :

1. That of the alluvial tract extending over the Gangetic Plain covering West Bengal, U. P. and East Punjab and the coastal strips of Eastern and Western Ghats. This is soft, deep and porous and therefore easy for ploughing. Chemically it is very rich. It is the source of rich crops.
2. The second type is that found in the crystalline tract, i. e., the tract which covers Southern Bengal, two-thirds of M. P., Southern-Eastern Bombay, Mysore and Eastern parts of Hyderabad. It is of poor quality and is deficient in some chemical salts. However, rice grows abundantly on it.
3. The third is the Deccan trap soil covering parts of Bombay, M. P. and the Deccan. It is the famous black soil which can retain moisture for months and is, therefore, very suitable for the growth of cotton.

(ii) Since India has a variety of climate, topography and nature of the soil, it has many varieties of forests. The main types are the following :—

1. Ever green forests growing in regions of good rainfall. They exist in Western Ghats, the Eastern Himalayas and Assam.
2. Monsoon forests in regions having less rainfall. Teak, sal, rosewood, ebony and sandal grow in these forests.
3. Scrub forests. These are found in the poor rainfall regions. Trees are thorny or mere scrubs.
4. Mountain forests. They are found on the South Indian hills above 5,000 ft. and on the Himalayas above 3,000 ft. They are temperate ever-green forests containing trees like oak, pine, deodar etc.
5. Mangrove forests. They are found along the sea-coast where land is flat and muddy. Willow, marsh, sindri etc. grow in them.
6. Dry forests. These are found in East Punjab and Bikaner. They contain Kikar, Jand, Kavir, Van, Shisham, Paleo, Amaltas, Date Palm, Pilu etc.

These forests are the source of timber and fuel woods, lac, resin, bees-wax, honey, matches, paper, turpentine, methylated spirits, acetic acid, acetone, material of tanning and many medicines.

(iii) Fishes are an additional source of food to human beings. In India nearly half the population of Bombay, Saurashtra, Bengal and Orissa eat fish. But, like many other sources, fisheries are not well developed in India, the annual production being only 7 lakh tons.

The main causes of this low productivity is the lack of large-scale organization which alone can tap sources of the deep sea and poverty of the fishermen engaged in this trade. Recently in Bombay and Madras new small mechanized vessels have been introduced and these are working satisfactorily, but to develop the industry on a satisfactory basis, the Planning Commission has made the following recommendations :—

1. Mechanization of existing craft for fishing with indigenous and improved tack and gear.
2. Where existing craft cannot be mechanized, designing new powered craft which would be sufficiently cheap and within the means of fishermen or their co-operative societies.
3. Introducing dory system where the mother craft is used for towing the boats to the fishing grounds or for carrying them in the mother craft.
4. Travelling for exploratory work.
5. Introducing preservation methods for fish that it may not get spoiled for over a fairly long period.

The Government of India has also taken a keen interest in the development of this industry. It is training fishermen under expert foreign advice and supervision and helping them with money and equipment. Much research work is also being done by research stations like the Central Inland Fisheries Research Station of Barrackpur, Central Marine Fisheries Research Institute at Mandapam and Deep Sea Fishing Station at Bombay. It is hoped soon there will be satisfactory output of fish.

(c) Five of the most important industries of India are :—

(i) **Cotton Textile Industry.** This industry owes its existence to Indian enterprise and hence is known as a swadeshi industry. It is to-day the largest national industry involving a capital of Rs. 100 crores with an output of Rs. 500 crores and gives employment to 15 million men. It is chiefly located at Bombay, Ahmedabad, Sholapur, Nagpur, Madras, Coimbatore, Madura and Delhi.

(ii) **Iron and Steel Industry.** It is India's great national industry giving employment to more than 60,000 persons. There

are 35 factories manufacturing iron and steel involving a capital of 30 crores. Tata Iron and Steel Works is the largest unit in this industry and probably the biggest in Asia. Next to these come the Steel Corporation of Bengal now amalgamated with Indian Iron and Steel Company Ltd. at Burnpur and another one is the Mysore Iron and Steel Works at Bhadravati. The annual output is about 1·5 million tons.

For the production of more steel an agreement was made in 1953 by the Government of India with the German Steel companies, Krupp and Demag which would erect a steel plant producing 500,000 tons of steel in the first instance and this would in stages be raised to 1,000,000 tons. It is expected that the cost on this plant will be 70 crores.

Another steel plant is being erected by the Russians in Madhya Pradesh in the Bhilai region and a third plant is being built by British firms.

(iii) **The Sugar Industry.** The sugar industry is the third largest industry in the country representing a capital investment of Rs. 35 crores and providing employment to about 130,000 labourers and 3,500 university men, a large number of transport workers and no less than 20 million agriculturists who are engaged in the cultivation of cane. The total value of the production of the sugar industry has been estimated at Rs. 400 crores. It is mainly localised in U. P. and Bihar. There are also a few mills at Bombay, Madras, the Punjab and Orissa.

(iv) **The Paper Industry.** It is one of India's big industries. Paper is being manufactured from wood-pulp, bamboo, rags and grass. There are at present 21 mills in the country but Calcutta is the one main centre. Besides Calcutta there are centres like Naihati, Raniganj, Lucknow, Bombay, Saharanpur, Panaher in Kerala, Sirpur in Hyderabad (Deccan), Bhadravati in Mysore, Poona, Dalmianagar, Sambhalpur in Orissa and Jagadhri in the Punjab.

(v) **The Cement Industry.** The cement industry is another important industry of India. It is a basic industry, for on it depends much of the development of the country. Its present output is about 45 lakh tons. Important factories are located at Madras, Porbandar and Jamnagar in Saurashtra, Katni in M. P., Bihar, Patiala, Rajasthan and Robertsgung in Mirzapur District (U. P.).

Note :—A full description of various industries of India is given in the **Bharat Year Book** which may be read for this type of questions.

Q. 21. Name the state in the Indian Union which has (a) The largest territory (b) The largest forest area (c) The largest desert area (d) The richest mineral resources (e) The largest number of universities (f) Two capitals (g) The largest number of textile mills.

(Assistant Grade Exam. Dec. 1955)

Ans. (a) The new state of Bombay, (b) Assam (c) Rajputana (d) Bihar (e) U.P. (f) Bihar : Winter capital Patna. summer capital Ranchi (g) Bombay state.

Q. 22. The following places have been in the news recently. Give (i) their location (ii) the event connected with them.

(a) Manila (b) Quemoy (c) Saigon (d) Bandung.

(Assistant Grade Exam. July 1955)

Ans. (a) Manila is the capital of the Philippines. It recently came into the news as it was here, that the Manila or the S.E.A.T.O Pact (or treaty) was signed by Great Britain, France, U.S.A., Australia, New Zealand, Pakistan, Thailand and the Philippines.

(b) Quemoy is an island in Formosa strait, off the coast of Fukien province of China. It came into news when it was intensely shelled by sorties of bombers of the Communist Chinese Government, when it made a vain effort to retake islands held by the Nationalist Chinese off the coast of the mainland.

(c) **Saigon.** Saigon is the capital of Viet Nam, on Saigon river. It came into the news, when in 1955 civil war broke out in South Viet Nam, the Hoa Hoa, Binh Xuyen insurgent fighting against the forces of the Central Government and there were street-to-street fightings in the city.

(d) **Bandung.** Bandung is the town of the Java state of Indonesia. It came into world news, when an Asian-African Conference was convened here by the governments of Burma, Ceylon, India, Indonesia and Pakistan, which passed a number of resolutions to promote the interests of the Asian-African Countries.

Q. 23. A. Indicate the importance of the following :

(a) Palam (b) Singapore (c) Malta (d) Vladivostok.

B What are the following famous for :

(a) Chittaranjan (b) Mohenjo-Daro (c) Taxila (d) Ajanta (e) Gol Gumbaz (f) Sarnath (g) Sialkot (h) Chitor (i) Fatehpur-Sikri (j) Sindri.

(Engineering Services Exam. Dec. 1955)

Ans. A. (a) Palam is a great air-field in New Delhi from which aircrafts fly to world's airfields (b) Singapur is a great commercial centre and major British naval base in Far East. It is the leading port for export of tin and rubber (c) Malta is the chief British

Mediterranean Naval and military base (d) It is the chief Russian Pacific port and is the terminus of the Trans-Siberian railway. It is also Russia's chief fishing and whaling base.

B. (a) Chittaranjan is famous for the newly erected Chittaranjan railway workshops (b) Mohenjo-daro in Pakistan is famous for the excavations carried on here which revealed the pre-Aryan Indus Valley Civilization (c) Taxila near Rawalpindi in Pakistan is famous for the excavations which revealed the ruins of the old city which was the seat of Buddhist learning here (d) Ajanta, a village near Aurangabad in the Deccan, is famous for the caves hewn out of solid rocks which contain a number of Buddhist monasteries and Hindu temples. They are a good example of ancient architecture, painting and sculpture (e) Gol Gumbaz, in Bijapur, which contains the tomb of Sultan Mohd. Adil is world's second largest dome, and is noted for its whispering galleries and multiple echoes (f) Sarnath, about four miles from Banaras is famous as the place where the Buddha delivered his first sermon, and where the first five disciples joined him who proved to be the nucleus of the Buddhist church (g) Sialkot in Pakistan is well known for its sports industry (h) Chitor in Rajasthan is famous as the fort city which was repeatedly defended most heroically by the Rajputs when it was attacked by the Muslim sultans and kings of Delhi. It contains the famous Tower of Victory built by Rana Kumbha and Mira Bai's temple (i) Fatehpur Sikri is a lone and deserted city about 26 miles from Agra. It was built in 1569 by Akbar as a token of thanks-giving, and contains the tomb of the famous saint Selim Chishti, Buland Darwaza and Jodhabai's palace (j) Sindri has sprung into prominence for the great fertilizer factory built here by the Government of India.

Q. 24. Where and what are the following ?—

(a) The Louvre (b) Nalanda (c) The Bridge of Sighs (d) The Durand Line (e) The White House (f) Harappa (g) Pan Mun Jon (h) Adam's Bridge (i) The Oval.

(National Defence Academy Exam. June 1956)

Ans. The Louvre is a museum in Paris containing many art treasures, famous among which are Leonardo's *Mona Lisa* and the sculpture *Victory of Samothrace* (b) Nalanda in Bihar was an ancient Buddhist University town to which scholars from different parts of the world were drawn (c) Bridge of sighs is a covered way in Venice (Italy) which connected the palace of the doge with the state prison. Prisoners were conveyed from the judgment hall to the place of execution through this passage, hence the name (d) Durand Line is the boundary line between Pakistan and Afghanistan (e) White House is the official residence in Washington of the

President of the U.S.A. (f) Harappa is a town in Pakistan where excavations of the Indus Valley civilizations were made (g) Pan Mun Jon is a village in Korea, south of 38th parallel of latitude, where parleys for truce between north and south Koreans took place. (h) Adam's Bridge is a chain of coral reefs and sandbanks connecting India with Ceylon (i) The Oval is the cricket ground near London where international matches are played.

Q. 25. State in two or three sentences what you know of the following :

A. (a) Panama Canal (b) Eiffel Tower (c) Empire State Building (d) The great Pyramids (e) Bhubaneswar (f) Somnath (g) Taj Mahal (h) Suez Canal.

B. (a) What are polar winds ? (b) What are igneous rocks ? (c) What are black cotton soils and where do they occur in India ? (d) What are laterite soil and where do they occur in India ? (e) What is soil erosion and what are the main eroding agencies ?

(Part a to c of Part A set in Military College Examination June, 1956, the rest in Military College Exam. January, 1956.)

Ans. A. (a) The Panama Canal is the canal that links the Atlantic and the Pacific across the isthmus of Panama lying between North and South America. It is built as a lake and lock canal across the narrowest portion of the Americas.

(b) **Eiffel Tower.** This is a colossal iron structure, being a tower standing 934 ft. high in Paris. It was built by A. G. Eiffel in about 1889.

(c) **Empire State Building.** This is the world's tallest building in New York. Its height is 1694 ft. It was built during 1930-31. It contains 102 stories and can house 2500 tenants.

(d) The Great Pyramids are massive tombs built by the Pharaohs in ancient Egypt, mainly between 4000 and 2900 B. C. Their purpose was to protect the mummified bodies of the Pharaohs and the wealth buried with them from the robbers. The Cheops at Giza which is about 481 ft. high is the most carefully constructed.

(e) Bhubaneswar is the capital of Orissa. It contains a number of ancient temples, most important of which are Mukteswar, Lingraj Parasurameswar, Panewali, Bhagwati, Ananta, Vasudeva etc. etc.

(f) **Somnath.** Famous temple at Prabhas Pattan, five miles from Veraval, a sea port on the west coast of India. The spot is famous because of the temple Mahmud destroyed in 1026. Its reconstruction was begun by Sardar Patel in 1947 and though it has been rebuilt, it has not regained its ancient fame and glory.

(g) **Taj Mahal** is the mausoleum of Mumtaz Mahal in Agra built by her husband, emperor Shah Jahan.

(h) **Suez Canal** is the canal in N. E. Egypt which links the Mediterranean at Port Said with the Gulf of Suez at Port Tarfiqu, and so with the Red Sea. It is 107 miles long and 42.5 ft. deep and 197 ft. wide. It was excavated during 1859-69 under the guidance of Ferdinand de Lesseps.

B. (a) The **Polar winds** are extremely cold winds that blow from the area of high pressure around the Poles towards the temperate regions. In the northern regions they blow from the north east and in the southern from south west.

(b) Igneous rocks are rocks which have solidified from a molten *magnum* from the earth's crust or on the surface of the earth, as for example, from lava. Example : granite

(c) Black cotton soils are fine fertile soils, black or brown in colour, which cover extensive areas in the U.S. S. R., Hungary, Rumania, India etc. In India this soil occurs in N. W. Deccan.

(d) Laterite soil is red soil chiefly found in damp tropical regions. It is very sticky and difficult to work. It occurs in considerable areas in peninsular India, also on the mountain sides of hills of Madhya Pradesh, the Eastern Ghats, Orissa, Assam, Bombay and Malabar coast.

(e) Soil Erosion. This term means wearing away the land surface by natural agencies. The most potent of these are : water, e. g., by the sea, river or rain, ice in the form of glaciers, frost melting, snow and to some extent wind, specially high winds, which also help in this process.

Q. 26. A. Write short notes on the following :—

- (i) Relief rains (ii) Rain shadow region, (iii) Meteorology (iv) Igneous rocks (v) Ocean currents

B. Where are the following places situated and what is their importance ?

- (i) Kandla (ii) Calicut (iii) Kakinada.

C. Name the state which has the largest number of

- (i) Cotton mills (ii) Sugar factories (iii) Jute mills (iv) Cement factories

D. Where are the following found in India ?

- (i) Saltpetre (ii) Chromite (iii) Asbestos (iv) Diamonds (v) Mica.

(Military Wing Exam. June 1955)

Ans. (A) (a) When moisture-laden winds encounter hills or mountains in their course, they are forced up due to such a relief of the land, for they get cooler when ascending up, and they precipitate their moisture on the mountain side they encounter. Such a rain is called a relief rain.

(b) **Rain shadow region** is that region or area of land which has a comparatively lighter or less average rainfall, due to its being sheltered from the prevailing rain-bearing winds by a range of mountains or hills than that side against which the rain bearing winds from the seas strike. This area is therefore situated on the leeward side of the ranges of the mountains or hills.

The best example is provided by the western ghats, where the side opposite the Arabian sea receives the maximum rain during the monsoons as the moisture-laden winds from the Arabian sea first strike against this side. The back or eastern side of the ghats, the rain shadow region receives a comparatively much less rain.

(c) **Meteorology** is that branch of science which deals with the factors influencing weather and climate.

(d) **Igneous Rocks.** See a previous question.

(e) **Ocean Currents.** These are currents set up on the surface of the oceans due to the movements of the surface waters. They are due either to the prevailing winds or the difference in density due to variations in temperature or salinity. The best known of these currents are the Gulf Stream and the Kuroshio.

(B) (i) **Kandla** is a port on the western coast of India in Kutch. It is being developed into a major port to provide an economic outlet for the large hinterland covering the Kutch, Saurashtra and the northern portion of the Bombay State, Rajasthan, Kashmir and western U.P.

(ii) **Calicut** is a port in the Madras state on its Malabar coast facing the Arabian sea. This was the first port visited by Vasco-da-Gama. This port is very important for the export of coffee, coconuts, tea and pepper.

(iii) **Kakinade** is one of the most important towns of Andhra state.

(C) (i) Cotton mills in Bombay state (ii) Sugar factories in U.P. (iii) Jute mills in W. Bengal (iv) Bihar.

(D) **Saltpetre** : U.P., and Bihar.

Chromite : Mysore, Singbhum in Bihar. In small quantities in Bombay and Orissa. Low grade in Salem, Ratnagiri and Vijayawada.

Asbestos : Bihar, Madras, Mysore (very limited quantities are produced.)

Diamond : Panna mines M.P., Golconda mines of former Hyderabad state. Diamonds are also quarried from Cuddapah, Anantpur, Bellary and Kurnool districts of Andhra.

Mica : Kodarma in Hazaribagh District of Bihar, and Nellore of Andhra Pradesh.

Q. 27. A. (i) What is approximately the total population of India according to the census of 1951 ?

(ii) Name the five largest cities of India.

(iii) Name any five of the National Laboratories established in India with their location.

(iv) Name the capitals of Punjab (India), Andhra, Madhya Pradesh, Orissa and Assam.

(v) What attempts have been recently made to climb the layan peaks and with what success ?

B. (a) Where are the following found in India ?

(i) Petroleum (ii) Manganese (iii) Gypsum (iv) Lignite (v) Gold.

(b) Where are the following grown in India ?

(i) Jute (ii) Cotton (iii) Linseed (iv) Tapioca (v) Tea.

(c) Where are the following manufactured in India ?

(i) Iron (ii) Ammonium sulphate (iii) Aluminium (iv) Paper (v) Telephone equipment. (Military Wing Exam. Jan. 1955)

Ans. A. (i) The population of India according to 1951 census is 356,829,485 (excluding Jammu and Kashmir) or 361.82 million including Jammu and Kashmir.

(ii) The five largest cities of India are :—

Calcutta with Howrah, Bombay, Madras, Delhi with New Delhi and Hyderabad.

(iii) 1. National Physical Laboratory, New Delhi.

2. National Metallurgical Laboratory, Jamshedpur.

3. National Chemical Laboratory, Poona.

4. Central Food Technological Institute, Mysore.

5. Central Drug Research Institute, Lucknow.

(iv) Capital of Punjab Chandigarh
 „ „ Andhra Hyderabad [Kurnool when the paper was set.]
 „ „ Madhya Bhopal [Nagpur when the paper was set.]
 „ „ Pradesh
 „ „ Orissa Bhubaneshwar
 „ „ Assam Shillong

(v) There have been several attempts in recent years to scale the Himalayan peaks mostly by foreigners. First attempt to conquer the Everest was made in 1921 by Col. Howard Budy who reached upto 22860 ft., other expeditions then followed, till Sir Hillary in company with Sherpa Tensingh reached it on May 30, 1953.

Attempts on other peaks were as follows :—

Nanga Parbat (28,620 ft.) was scaled by Bubal Herman in 1953, Panch Chuli peak was conquered in 1953 by P. Nikore, Kedarnath (22,772 ft.) by Rock and Sultar in 1947, Annapurna (26,502 ft.) by a French expedition in 1950. In 1954 K₂ or Godwin Austin (28,250 ft.) was scaled by an Italian expedition.

- B. (a) Petroleum.** Digboi in Assam.
- Maganese.** Srikakulam district in Andhra Pradesh, Mysore, M.P., Bombay, Bihar and Orissa.
- Gypsum** Mostly Rajputana, coastal belt in Saurashtra and Kutch, Nellore and Trichnopoly in South India, Central India (Utarlai, Khawas, Dhinera, Rewa, Rajpipla).
- Lignite.** Arcot Dist. Madras.
- Gold.** Mysore.
- (b) (i) **Jute** West Bengl, Assam, Orissa, Bihar, Cooch Bihar, Tripura, Madras and Kerala.
- (ii) **Linseed.** Madhya Pradesh, U. P., Bihar, West Bengal and Andhra.
- (iii) **Tapioca.** Kerala.
- (iv) **Tea.** Darjeeling in Assam, Kangra District, Punjab, Dehra Dun in U.P., Nilgiris in South India.
- (c) **Iron Industry.** Jamshedpur in Bihar, Hirapur and Burnpur in W. Bengal, Bhadravati in Mysore, etc.
- (ii) **Ammonium sulphate.** At Sindri, also in Kerala, (Fertilizers and Travancore Ltd.)
- (iii) **Aluminium.** Jakaynagar (Aluminium Corperation of India Ltd.) ; Murti (Indian Aluminium Co.)
- (iv) **Paper.** Calcutta (Titaghur mills), Naihati, Ranigunj, Lucknow, Bombay, Saharanpur, Panker in Kerala, Bhadravati in Mysore, Dalmianagar in Bihar, Sambalpur in Orissa, Jagadhri in Punjab.
- (v) **Telephone Equipment.** Bangalore, also at Rupnarainpur to manufacture telephone cables.

Q. 28. (a) Name any four of the leading steel producing countries of the world.

(b) Name any four of the languages of the world, spoken or understood over the largest areas.

(c) Name the monetary units of the U.S.A., U.S.S.R. France, Canada, Australia and Burma ?

(d) Name any four of the states with the largest areas in the world.

(e) How does Cyprus come into the news ?

(f) How does Israel come into the news ?

(g) What was the problem of the Suez canal zone ?

(h) What is Abadan known for ?

(i) What are the Portuguese possessions in India ?

(j) On what sea is Port Said situated ?

(Joint Services Exam. June 1956)

Ans. (a) U.S.A., U.S.S.R., Great Britain, West Germany.

(b) Chinese, English, Hindustani, Russian.

(c) U.S.A. : Dollar

U.S.S.R. : Rouble

France : Franc

Canada : Canadian Dollar

Australia : Australian pound

Burma : Burmese rupee.

(d) U.S.S.R., Brazil, U.S.A., China.

(e) Because of the intense agitation carried on in the island by Cypriot Greeks for a union or Enosis with Greece, which both their British rulers and Cypriot Turks oppose. A strong terrorist movement has sprung up which is associated with terrorist activities.

(f) There have been constant border clashes between Israel and its neighbouring Arab countries, which have now and then kept the headlines in world's news. Most recently because it collaborated with the English and the French to make an attack on Egypt.

(g) The Egyptian government wanted to nationalize the Suez canal, take the management of the Suez canal in its own hands and that the Suez canal dues must be paid to its agencies. The British and French who had been controlling the Suez canal hitherto opposed this move, not only because it meant passing away from them this lucrative source of income, but control of the canal itself. The Egyptians could discriminate against their ships in the matter of realization of tolls or obstruct the passage of their ships, but even

block this life-line of their empires to the East if there were not good relations between them.

(h) For its oil refinery.

(i) Goa, Daman, Diu.

(j) On the Mediterranean (at entrance to Suez Canal).

Q. 29. (A) Name the states where the following are situated :—

(i) Ellora caves (ii) Elephanta caves (iii) Bhubneshwar temple (iv) Nalanda Excavations (v) Hampi Ruins.

(B) Given below are names of ten industries and ten cities. Against the names of each write down the corresponding industries.

Textiles, steel, leather goods, hosiery, aircraft, ship-building, petroleum refining, fertilizers, gold mining, locomotives.

(a) Kanpur (b) Ludhiana (c) Bombay (d) Ahmedabad (e) Vishakhapatnam (f) Jamshedpur (g) Sindri (h) Kolar (i) Bangalore (j) Chittaranjan.

(Joint Services Wing Exam. Jan. 1955)

Ans. (A) (i) Hyderabad (ii) Bombay (iii) Orissa (iv) Bihar (v) Madras.

(B) Kanpur : Leather goods
Ludhiana : Hosiery
Bombay : Petroleum refining
Ahmedabad : Textiles
Vishakhapatnam : Ship building
Jamshedpur : Iron and steel
Sindri : Fertilizers
Kolar : Gold
Bangalore : Aircraft
Chittaranjan : Locomotives

Q. 30. (A) What do you know of the following ? :—

(a) Sarnath (b) Elephanta caves (c) 10 Downing street (d) The "Dufferin" (e) Wall street (f) Suez (g) Sewagram (h) Kandla (i) Gibraltar (j) Bandung.

(B) What do you know of the following :—

(i) Sindri (ii) Rourkela (iii) Jalahali (iv) Sambar Lake (v) Vishakhapatnam.

(Indian Navy Exam. Dec. 1957)

Ans. (A) (a) Sarnath. Place near Banaras known for Buddhist temples and remains. It was in the Deer Park at Sarnath that the Buddha delivered his first sermon on Nirvana. It was here that his five disciples joined him.

(b) **Elephanta caves.** These are famous cave temples of the 8th century A. D. about 6 miles from Bombay out into the sea reached by a boat. They contain huge carved dieties and panels of Hindu mythology. Most striking of these are the images of the Trimurti, representing the triple aspect of Divinity.

(c) **10 Downing street** is the official residence of the Prime Minister of Great Britain, also of the Chancellor of Exchequer and the Chief Whip.

(d) **The "Dufferin."** Training ship of the Indian Navy.

(e) **Wall Street.** In lower New York, U. S. A., the Stock Exchange. It contains most of the banks, insurance offices, shipping offices. It is in fact the hub of the American financial world.

(f) **Suez** is the Gulf at the Northern end of the Red Sea between Egypt and Sinai peninsula. A port at the southern end of the Suez canal is also called Suez. The famous Suez canal connects the Mediterranean with the Gulf of Suez.

(g) **Sevagram.** It is a village near Wardha where Mahatma Gandhi lived.

(h) **Kandla.** Port in Kutch, which is being developed into a major port to serve the large area which is its hinterland, comprising of Rajasthan, west U. P., Punjab, as also Kashmir.

(i) **Gibraltar** is a town constituting a British crown colony located at the N. W. end of the Rock of Gibraltar which is situated at the west end of the Mediterranean, where that meets the Atlantic ocean.

(j) **Bandung.** Town of the Java island of Indonesia. The famous Bandung Conference of Asian African independent countries met here.

(B) (i) **Sindri.** Town in Bihar, where the government Fertilizer factory has been located.

(ii) **Rourkela** Town in Orissa, where a great iron factory by the German Demag and Co. is being built.

(iii) **Jalahali.** Town in Mysore state where the Hindustan Tool factory is located. It has also the Government. I. A. F. training school.

(iv) **Sambhar Lake.** Lake in Rajasthan, well known for the production of great quantities of salt by evaporating its water.

(v) **Vishakhapatnam.** Port of Andhra Pradesh. Scindia ship-yards are situated here.

Q. 31. (A) .What do you know of the following ?

(a) Jama Masjid (b) Rashtrapati Bhawan (c) Kremlin (d) Fleet Street (e) Visva Bharti (f) Jakarta.

(B) What is the importance of each of the following places ?

(i) Chittaranjan (ii) Jharia (iii) Titagarh (iv) Kolar.

(C) (a) Name five river valley projects of India.

(b) Name the five most sugarcane-growing states of India.

(c) What do you know of the Dravidians ?

(d) Name the five most important ports of India.

(Indian Navy Exam. July 1956).

Ans. (A) (a) **Jama Masjid.** Delhi's famous masjid built in 1648-50 by Shahjahan, south of Chandni Chowk. It is among the biggest of Muslim Masjids in the world. Has a front count of 450 ft.

(b) **Rashtrapati Bhawan.** Formerly called the Viceregal Lodge, it is Government House, New Delhi. It contains the official residence of the President of India. It was built by Sir Edwin Lutyens

(c) **Kremlin.** Citadel in the heart of the city of Moscow, U. S. S. R. It contains now government offices, museums etc. Founded by Ivan III in 1485.

(d) **Fleet street.** Well known London street. Near about are most newspapers, printing and press assistant offices, hence in London it is a symbol of Journalism.

(e) **Visva-Bharti.** Also called Shantiniketan, is an international university founded by Rabindra Nath Tagore. Situated about 100 miles from Calcutta. Symbolises the culture of the East and the West.

(f) **Jakarta.** Capital and first city of Indonesia in N. W. Java island.

(B) (i) Chittaranjan contains the Govt. of India's locomotive workshop.

(ii) Jharia is well-known for its coal mines.

(iii) Titagarh contains the famous Titagarh paper mills.

(iv) Kolar contains the gold mines. In Mysore.

(C) (a) Damodar Valley project in W. Bengal, Hirakud Dam project in Orissa, Bhakra-Nangal Dam Project in E. Punjab, Rampadsagar Project in Andhra Pradesh, Rajasthan's Chambal Valley project.

(b) U. P., Bihar, Bombay, Madras, East Punjab.

(c) Dravidians were people who inhabited India before the coming of the Aryans. Driven away by the Aryans they came to settle chiefly in the south of the Deccan. Their present day progeny is the Tamil speaking people of the South.

(d) Bombay, Calcutta, Vishakhapatnam, Surat, Kandla.

Q 32. (a) Name the five principal rivers of peninsular India.

(b) Mention four important export commodities of India.

(c) Name five important towns in the Ganges valley.

(d) What are the five most important elements in the earth's crust.

(e) Which of the following places have an average annual rainfall of over 30 inches.

Calcutta, Delhi, Bombay, Madras, Nagpur, Mussoorie, Simla, Ludhiana, Kanpur.

(Indian Navy Exam. 1955)

Ans. (a) Narbada, Mahanadi, Godavari, Krishna, Cauvery.

(b) Jute goods, Textiles, Manganese, Mica.

(c) Hardwar, Kanpur, Allahabad, Banaras, Patna.

(d) Oxygen (50%), Silicon (26%), Aluminium (7%), Iron (4%) Calcium (3%).

(e) Calcutta, Bombay, Nagpur, Mussoorie.

Q. 33. (A) Who are these and where do you find them ?

(a) Bantus (b) Cockneys (c) Deccanis (d) Eskimos (e) Red Indians (f) Todas (g) Maoris (h) Gurkhas (i) Bedouins (j) Felippinos.

(B) Mention the following :—

(a) Highest mountain Peak (b) Largest desert (c) Largest Diamond Mine (d) Place with highest rainfall (e) Biggest Museum (f) Longest River (g) Largest River (h) Largest Delta (i) Desert Population (j) Highest country.

(C) Against each of the following, write the name of one province or state in India where it is abundantly found.

(i) Coal (ii) Gold (iii) Mica (iv) Gypsum (v) Saltpetre.

(D) Where are the following in India?

(i) Hindustan Aircraft Factory ?

(ii) National Chemical Laboratory.

(iii) Indian Agricultural Research Institute.

(iv) School of Tropical Medicine.

(v) Tata Institute of Fundamental Research.

(Indian Navy Exam. July 1955)

Ans. (A) (a) **Bantus** are negroid races of Africa living mostly between 6° N Lat. to 20° S Lat.

(b) **Cockney**. Term applied to one born in London and knowing little or nothing beyond it.

(c) **Deccanis**. Inhabitants of the Deccan.

(d) **Eskimos**. Aboriginal people of the Mongolian or Red Indian stocks living along the whole of Arctic littoral, from N. W. Greenland, across Canada and Alaska to East Cape in Siberia.

(e) **Red Indians**. They are the aboriginal races of the New World. They are fast dying out, but are still to be found in

preserves specially in Oklahoma, Arizona, etc. in the U. S. A., but have mixed with other races in other parts of America.

(f) **Todas.** Aborigines of the Nilgiri hills.

(g) **Maoris.** The original inhabitants of New Zealand.

(h) **Gurkhas.** Natives of Nepal. A martial race. Mixture of Rajput and Mongol.

(i) **Bedouin** Nomadic camel-breeding tribes of the Arabian desert.

(j) **Philippines.** Christianised natives of the Philippines islands.

(B) (a) Mount Everest (b) The Sahara (c) Kimberly Mines, Union of South Africa (d) Cherapunji in Assam (e) British Museum (London) (f) Mississippi-Missouri (g) The Amazon (h) The Gangetic delta (32,000 sq. miles) (i) Monaco (j) Tibet

(C) (i) Bihar (ii) Mysore (iii) Bihar (iv) Rajputana (v) U.P.

(D) (i) Bangalore (ii) Poona (ii) New Delhi (iv) Calcutta (v) Bombay.

Q. 33. (a) What is the capital of (i) South Africa (ii) Ethiopia (iii) Indonesia (iv) Australia (v) Lebanon.

(b) Who reached the North Pole first?

(c) Who conquered Everest and when?

(d) When do neap tides occur?

(e) What is the difference in time between Greenwich and a place located 90° west longitude?

(f) What causes the seasons?

(g) What and where are the following :—(i) Gobi (ii) Helsinki (iii) Wular (iv) Atlas (v) Etna

(Indian Navy Exam., July 1954)

Ans. (a) (i) Legislative capital Cape Town, Administrative capital Pretoria (ii) Adis Abbaba (iii) Jakarta (iv) Canberra (v) Beirut

(b) Peary, American explorer (in 1909)

(c) Sir Edmund Hillary and Sherpa Tensing in 1953.

(d) When the gravitational pull of the sun is opposed, i.e., it is at right angles to that of the moon.

(e) As for every 15° Lat. the difference is of 1 hour, there will be difference of 6 hours. As the place is 90° west of Greenwich, if it is 12 O'clock noon at Greenwich, it will be 6 A. M. at that place.

(f) Seasons are mainly caused by the inclination of the earth's Axis to the plane of the Ecliptic and the revolution of the earth about the sun.

(g) (i) Gobi is a sandy treeless plateau mostly in Mongolia.

(ii) Helsinki is the capital and largest city of Finland. It is a port on the Gulf of Finland

(iii) Wular is a large lake in Kashmir a few miles down from Srinagar.

(iv) Atlas is a range of mountains in N. W. Africa, mostly in Morocco, Algeria and Tunis.

(v) Etna is a volcanic mountain on the East Coast of Sicily.

Q. 34. (A) Against each of the following note a state in India, where it is grown on a large scale.

(i) Coffee (ii) Tea (iii) Jute (iv) Cotton (v) Cinchona.

(B) Where are the following chiefly found in India ?

(i) Gold (ii) Coal (iii) Monazite (iv) Manganese (v) Mica.

(C) Name a prominent hill station in each of the following:—

(i) Madras (ii) West Bengal (iii) Madhya Pradesh, (iv) Bombay (v) Himachal Pradesh.

(D) Name the capitals of the states mentioned below :—

(i) Vindhya Pradesh (ii) Madhya Pradesh (iii) Jammu & Kashmir (iv) Andhra (v) Uttar Pradesh.

(E) Write short notes on :—

(i) Cyclones (ii) Spring and neap tides (iii) Mediterranean type of climate (iv) Equinoxes.

(Special Class Railway Exam. June 1956)

Ans (A) (i) Coffee in Kerala State (ii) Tea in Assam, specially Darjeeling (iii) Jute in West Bengal (iv) Cotton in Bombay state, specially Gujarat, Kathiwar Peninsula (v) Cinchona in the Nilgri hills in Madras.

(B) (i) Gold in Kolar fields Mysore etc. (ii) Coal in Jharia and Giridih mines Bihar, and Raniganj coal-fields of W. Bengal. (iii) Monazite in the sands off the sea-shore of the Kerala state (iv) Manganese chiefly in Madhya Pradesh (Balaghat, Bhandara, Dongri Buzurg (v) Mica in Kodarma in Hazribagh district of Bihar, which alone produces 80 % of the total output.

(C) (i) Ootacamund in Madras (ii) Darjeeling in West Bengal. (iii) Pachmarhi in M. P. (iv) Mahabaleshwar in Bombay (v) Simla H. P.

(D) (i) Rewa was the capital of the former Vindhya Pradesh (ii) Nagpur that of former M. P. when the paper was set. Note The present capital is Bhopal (iii) Capital of Jammu and Kashmir is Srinagar (iv) Capital of Andhra was Kurnool when the paper was set. Note. Present capital is Hyderabad (v) Capital of Uttar Pradesh is Lucknow.

(E) (i) Cyclones are whirling masses of air, which often occur in the tropics and move in the direction of prevailing winds usually in the direction of the poles. They move in an anticlockwise direction in the northern hemisphere and in a clockwise direction in the southern hemisphere.

(ii) Spring tides are tides of great amplitude when the earth, the sun and the moon happen to be in the same line. This is due to the gravitational pull acting in the same direction. It is neap tide or the lowest tide, when the gravitational pull of the moon is at 90° to that of the sun.

(iii) This is the type of climate experienced by land bordering the Mediterranean Sea, and by other regions similarly situated. It is dominated by the Westerlies in winter, and there is moderate rain during this season, while the Trade winds blow in summer, but this season is hot and dry.

(iv) Equinoxes.

GEOGRAPHY

GEOGRAPHY

Q. 1. In what city are or were the :—

- | | |
|------------------------|---------------------------------|
| (a) Wailing wall | (j) Kremlin |
| (b) Statute of Liberty | (k) St. Peters Cathedral |
| (c) Alhambra Palace | (l) The Bridge of Sighs |
| (d) Hanging Gardens | (m) Waterloo Bridge |
| (e) Taj Mahal | (n) The Cathedral of Notre Dame |
| (f) Scala | (o) The Church of St. Germain |
| (g) Big Ben | (p) Alexandra Docks. |
| (h) Cenotaph | |
| (i) Gateway of India | |

Ans. (a) Jerusalem (b) New York (c) Granada in Spain (d) Babylon (e) Agra (f) Milan (g) London (h) London (i) Bombay (j) Moscow (k) Rome (l) Venice (m) London (n) Paris (o) Paris (p) Bombay.

Q. 2. Name :—

- (1) The highest mountain in Europe.
- (2) The sea into which flow (i) the Brahmaputra ; (ii) the Narbada (iii) the Sindhu (iv) the Danube (v) the Volga.
- (3) Five volcanoes, active or quiescent, but not extinct. Mention also the countries in which they are located.
- (4) Name the chief countries where gold, lead and platinum are produced.
- (5) The capital of the Republic of Phillippines.
- (6) The largest state of India according to area.
- (7) The largest arch span bridge in the world.

Ans. (1) Mount Elburz 18,571 ft. high (2) (i) The Bay of Bengal (ii) Gulf of Cambay (iii) Arabian Sea (iv) Black Sea (v) Caspian Sea (3) Etna in Sicily, Kilimanjaro in Tanganyika, Mauna Kea and Muna Loa in Hawaiian islands, Katmai in Alaska (4) Gold in Transvaal in South Africa ; Australia ; N. America (Klondike etc.) and Russia ; lead in U.S.A., Australia and Central Spain ; Platinum in Ural Mountain, U.S.A., Brazil, South Africa (5) Manila (6) Bombay (7) Sydney Harbour Bridge in Australia, 1650 ft. in length.

Q. 3. Where are the following places and what are they noted for ? :—

(1) Pusan (2) Coolgardie (3) Dum Dum (4) Ajanta (5) Bonn (6) Seoul (7) Assansoal (8) San Fransisco (9) Drakensberg mountains (10) Capitol Hill (11) The Palatine Hill.

Ans. (1) Port of South Korea, where the American and other U.N. forces landed with their supplies to fight the North Koreans (2) A mining town and headquarter of the rich gold fields in Western Australia (3) A town in West Bengal near Calcutta, having a military post with a small arms factory wherefrom came the well known dum dum bullet. It was here in 1857 that the sepoys first mutinied (4) A village in the former state of Hyderabad near which have been discovered a series of caves with unparalleled examples of Buddhist fresco painting, and the most perfect and complete Buddhist caves in India (5) The capital of the West German Republic with a famous University. The city is the birth place of Beethoven and has a monument to his memory (6) Capital of South Korea which was much in the news during the early stages of the fight between the North and the South Koreans (7) Town in Bengal, centre of the coal industry (8) City of California U. S. A. and premier port of the Pacific coast, noted for its shipbuilding, metal packing, sugar refining and the manufacture of metal goods and clothing. (9) Drakensberg mountains is a range of mountains in South Africa between Natal and Bausotaland and the Orange Free State (10) Capital Hill is the site of ancient Rome's temple of Jupiter and symbolic centre of the city through the ages (11) Palatine Hill : Hill in Rome city on the flank of which Romulus is said to have founded the city of Rome on April 21, 753 B.C.

Q. 4. Name :

(1) The smallest continent (2) The country with the highest table-land (3) Largest Peninsula (4) The deepest lake (5) The largest lake (6) The largest fresh water lake in Asia (7) The driest place (8) The wettest place (9) Largest single country.

Ans. (1) Australia (2) Tibet (3) India (4) Lake Baikal (5) Caspian Sea (6) Lake Baikal (7) Jacobabad and the South west coast of Baluchistan (8) Cherrapunji in Assam (9) Brazil.

Q. 5. Name the following :—

- The longest river in the world.
- The deepest ocean.
- The most thickly populated region.
- The largest lake.
- The planet which is nearest to the sun.

Ans. (a) Mississippi-Missourie (b) The Pacific (c) The Indo-Gangetic plain (d) Lake Caspian (e) Mercury.

Q. 6. (A) Wherefrom does the world get its main supply of :—

(1) Tin (2) Rubber (3) Jute (4) Sulphur (5) Cotton (6) Petroleum (7) Silver (8) Teak (9) Clove.

(B) Name the countries of the world which are the chief producers of :—

(1) Coffee (2) Tea (3) Tobacco (4) Rice.

Ans. (A) (1) Malaya, Australia, Bolivia and Cornwall (2) Inlands of the Indonesian Republic, Ceylon, Central and South America, West Africa and India (3) The two Bengals and Assam (4) Sicily and the States of Louisiana and Texas of N. America (5) India, Egypt, China, the U.S.A., Sudan and the U.S.S.R. (6) The U.S.A., Iran, Iraq, Rumania, Arabia, Russia, Burma, and some of the Islands of the Indonesian Republic (7) Peru, Mexico, Canada, New South Wales (8) India, Burma, Ceylon, Malaya and Java (9) Molucca Islands, Zanzibar, Java, Sumatra and West Indies.

(B) (1) Brazil, Java, Haiti, Costa Rica, India, Kenya, Tanganyika, Arabia and Abyssinia (2) India, China and Ceylon (3) U.S.A., Turkey, Mexico, South and North Rhodesia, Nyasaland, S. Africa, Canada, Malaya, India and the Balkans, (4) India, Ceylon, East Pakistan, Burma, Malaya, the Islands of the Indonesian Republic, China, Japan, countries bordering on the Mediterranean, specially Egypt ; U.S.A. and Brazil.

Q. 7. Where are the following and why is each important ?

(1) Africa Highway (2) Alsace-Lorraine (3) Bretton Woods (4) Singapore (5) Aden (6) Tel Aviv (7) Munich (8) Barcelona (9) Eton (10) Taxilla (11) Geneva (12) Durban (13) Rajghat (14) Pisa (15) Greenwich (16) Macedonia.

Ans. (1) A highway connecting Cape Town and Algeria. It was constructed during and after World War II as it connects the southernmost end of Africa with the Northernmost end of the continent (2) Eastern border province of France which has been the bone of contention between France and Germany specially because of its great wealth in potash and iron ore and because of its strategic position (3) A town in New Hampshire U.S.A., where in international agreement, called the Bretton Woods Agreement, on the stabilization of currencies and on international loans was concluded in July 1944 (4) It is an island lying off the southern tip of the Malaya Peninsula to which it is joined by a causeway across the strait of Johore. It is the chief British Naval base in the Far East and one of the most powerfully defended ports in existence. It is also a military and air station (5) British port and colony on the south coast of Arabia commanding the southern entrance to the Red Sea. It is a great coaling and military station (6) A Jewish

city of Palestine and former capital of the state of Israel (7) Capital of Bavaria, Germany. It is famous for its magnificent buildings and art treasures. Here the famous Munich Agreement was concluded on 29th September 1938, between Great Britain, France, Germany and Italy concerning the cession of the Sudetanland to Germany (8) A large town and the chief seaport, as well as the largest manufacturing town of Spain, called the Manchester of Spain (9) A town and urban district of Great Britain. Famous public school founded by Henry VI (10) Town in North-West Punjab (Pakistan) famous for the excavations by Sir John Marshall; old site of Buddhist centre (11) City of Switzerland; was headquarter of the League of Nations, now used by the U.N. Famous for its watchmaking, jewellery and electrical goods. (12) Port of Natal through which are exported maize, wool and hides. (13) In Delhi by the side of the Jamuna, famous the world over as the Samadhi of Mahatma Gandhi (14) In Italy, known for its famous leaning tower. A University town (15) Borough of London. Famous for its observatory from which standard time is reckoned. First meridian begins from here. (16) At one time the seat of a great empire by Alexander the Great, now divided between Greece, Yugoslavia and Bulgaria.

Q. 8. Give the approximate population of :—

(a) (1) Uttar Pradesh (2) East Punjab (3) West Bengal (4) Canada (5) The British Isles (6) The Union of South Africa.

(b) In which countries are the following the monetary units ? :—

(1) Leu (2) Zloty (3) Rouble (4) Krona (5) Cordoba (6) Yen (7) Rial (8) Drachma (9) Sucre and (10) Peso.

Ans. .(a) (1) 63,215,742 (2) 16,134,890 (3) 26,302,386 (4) 13,549,000 (5) 48,532,000 (6) 12,320,000.

(b) (1) Rumania (2) Poland (3) U.S.S.R. (4) Sweden (5) Republic of Nicaragua (6) Japan (7) Iran (8) Greece (9) Ecuador (10) Cuba, Chili, Colombia.

Q. 9. What country or city do you call ?

(1) Land of Maple (2) Queen of the Adriatic (3) Playground of Europe (4) City of Seven hills (5) Land of the Midnight Sun (6) Gift of the Nile (7) City of Motor Cars (8) The city of Ghosts and Temples (9) Roof of the World (10) The Dark Continent (11) Bride of the Sea (12) The Celestial Empire.

Ans. (1) Canada (2) Venice (3) Switzerland (4) Rome (5) Hammerfest (Norway) (6) Egypt (7) Detroit (8) Banaras (9) The Pamirs (10) Africa (11) Venice (so called from the ancient ceremony of the wedding of the sea by the doge, who threw a

ring into the Adriatic, saying "We need thee O sea in token of perpetual domination") (12) China has been called the "Celestial Empire."

Q. 10. Where in India would you find the following ? :—

- | | |
|----------------|--------------------|
| (a) Gold | (f) Coffee |
| (b) Lac | (g) Iron and Steel |
| (c) Jute | (h) Sugar |
| (d) Tea | (i) Cinchona |
| (e) Sandalwood | (j) Rosewood |

Ans. (a) Gold from the gold-fields of Kolar in Mysore, and the Hutti gold mines of Raichur district former Hyderabad.

(b) Lac in Chota Nagpur, Madhya Pradesh, Assam, Bengal and Gujrat.

(c) The chief producing states are : West Bengal, Assam, Bihar and Orissa and Cooch Bihar.

(d) Tea in Darjeeling, Assam ; the Kangra district in East Punjab ; Dehra Dun in Uttar Pradesh and in the Nilgiris.

(e) Sandalwood in Madras, Mysore and some parts of adjoining territories in South India.

(f) Coffee in Kerala, Mysore, Cochin, the Nilgiri hills and Coorg.

(g) Iron in Saleem in Madras, Chanda, Bastar and Durg districts in Madhya-Pradesh, Mysore state, Mayurbhanj in Orissa state, Singhbhum in Bihar, steel in Jamshedpur, Bihar, West Bengal (Steel Corporation of Bengal, amalgamated with the Steel Company Ltd.) and Mysore.

(h) Sugar industry is localised in U.P. and Bihar, though a few mills in Bombay, Madras and elsewhere also produce some sugar.

(i) Cinchona : West Bengal and Madras are the two largest producers, other places where it is produced are : Nilgiris, Mysore and Kerala.

(j) Rosewood is found chiefly in Peninsular part of the country and Nepal.

Q. 11. What is the geographic location, capital and commercial importance of the following ? :—

- | | |
|---------------|-----------------|
| (a) Israel | (f) Manchuria |
| (b) Haiti | (g) Ukraine |
| (c) Peru | (h) Siam |
| (d) Mexico | (i) Denmark |
| (e) Indonesia | (j) New Zealand |

Ans. (a) Israel is the western part of Palestine mostly along the Mediterranean; Haifa is in the north, while the Rehoboth area is in the sea. The Dead Sea touches it in the East. The capital is Jerusalem.

The commercial importance of Israel lies in its great citrus industry. Citrus fruit, citrus concentrates and other citrus by-products are exported in large quantities mostly to the U.K. and U.S.A. Exports of citrus fruits is about 3,800,000 boxes approximately.

(b) Haiti forms the western third of the island of Hispaniola which is one of the islands of the West Indies. Its capital is Port au Prince. Its commercial importance lies in its great agricultural crops, namely, coffee, sugar, bananas, sisal, cotton and cocoa, all of which are mostly exported.

(c) Peru is a republic of Western South America. It lies between Brazil and Bolivia and the Pacific which washes its western shores. Lima is its capital. The country's commercial importance lies in some of its mineral and crops products, which are exported in considerable quantities. Most important of these are: petroleum, copper, raw cotton (called the Ica) and sugar.

(d) Mexico lies south of the U.S.A. between the Gulf of Mexico and the Pacific. Mexico city is the capital. Mexico's commercial importance lies in the fact that it out-ranks all other countries of the world in silver production. Mexico also produces nearly all of the world's chicle—the juice of the Sapodilla tree, used as the base of chewing gum.

(e) Indonesia comprises a group of islands—Java, Sumatra, Borneo and Celebes and a number of minor ones—lying to the south-east of the Malaya, and north and north-west of Australia. The capital is Batavia.

Indonesia, comprising the famous spices islands and has been, commercially the most important region of the world. It produces about one-third of the world's copra, also more than one-third of its rubber and the major part of its pepper and quinine. It also produces large quantities of sugar, palm oil, tea, coffee, tobacco, cacao, and spices, all of which go to world markets.

(f) Manchuria is the north-east part of China, comprising its three provinces *viz.* Feugtien, Kirin and Heilungkaing. Its commercial importance lies in the fact that it is probaly the richest industrial area in China and has about two-thirds of her heavy industry. Its forests also supply lumber to major part of northern China. Capital is Mukdan.

(g) Ukraine is one of the republics of the U.S.S.R. It is bounded on the north by the White Russian republic, on the south by the Black Sea and on its west lie Rumania and Poland. Kiev is the capital. It is the granary of the U.S.S.R., growing

immense quantities of wheat and sugarbeet. Its commercial importance also lies in large coal, iron and manganese mines.

(h) Siam occupies the central portion of Indo-Chinese peninsula wedged in between Annam and Cambodia on its east and Burma on its west. Bangkok is its capital. It is of great commercial importance, as it is one of the rice bowls of the world. Its teak-wood, rubber, coconuts, tobacco and cotton are of great commercial importance, which, along with rice, are exported in large quantities.

(i) Denmark is a peninsula in the Baltic Sea north-west of Germany. Its capital is Copenhagen. Commercially it is important because of its rich production of meat, butter, eggs and cheese, which it supplies to Europe in large quantities.

(j) New Zealand lies about 1200 miles east of Australia. Its capital is Wellington. New Zealand's commercial importance lies in the fact that it is world's largest exporter of mutton, lamb, wool, butter and cheese.

Q. 12. (a) Name the capital of the following countries :—

(1) Argentina (2) Ceylon (3) Bulgaria (4) The Peoples' Republic of China (5) Republic of West Germany (6) The Netherlands (7) Turkey (8) Siam.

(b) Name the countries in which the following towns are situated :

(1) Marseilles (2) Zurich (3) Bassein (4) Dacca (5) Wellington (6) Pilsen (7) Salonika (8) Yokohama (9) Beirut (10) Pohang.

Ans. (a) (1) Buenos Aires (2) Colombo (3) Sofia (4) Peking (5) Bonn (6) Amsterdam (7) Istanbul (8) Bangkok.

(b) (1) France (2) Switzerland (3) Burma (4) East Pakistan (5) Newzealand (6) Czechoslovakia (7) Greece (8) Japan (9) Lebanon (10) South Korea.

Q. 13. With what city do you connect the following ? :—

(1) Eiffel Tower (2) Piccadily (3) Anarkali (4) Bodleian library (5) Broadway (6) Kremlin (7) Trafalgar Square (8) Vailing Wall (9) Elephanta Cave (10) The White House.

Ans. (1) Paris (2) London (3) Lahore (Pakistan) (4) Oxford (5) New York (6) Moscow (7) London (8) Jerusalem (9) Bombay (10) Washington.

Q. 14. What particular commodity or commodities would you expect to get from ? :—

(1) Kimberley (2) Belgian Congo (3) Ahmedabad (4) Kanpur (5) Calcutta (6) Malaya (7) Baku (8) Kashmir (9) The Rand (10) Shillong (11) Northern Rhodesia.

Ans. (1) Diamonds (2) Rubber and timber (3) Textiles (4) Leather goods and Textiles (5) Jute goods, paper etc. (6) Spices, rubber and tin (7) Petroleum (8) Fruits, timber and shawls (9) Gold (10) Tea (11) Copper.

Q. 15. Name :—

(1) The planet which is the farthest from the sun (2) the nearest to the sun (3) the smallest of the known planets (4) the biggest of the planets (5) a sign of the Zodaic (6) a state in Canada.

Ans. (1) Pluto (2) Mercury (3) Mercury (4) Jupiter (5) Gemini (6) Ontario.

Q. 16. Name some of the principal ship canals of the world, their lengths and the year of their opening if you know them.

	Canal	Length in miles	Year of opening
Ans.	1. Panama Canal	50½	1914 Separates the two Americas.
	2. Kiel „	53.3	1895 (Germany)
	3. Suez „	87.5	1869 (Egypt).
	4. Manchester „	46.5	1894 (England)
	5. Amsterdam „	13	1876 (Netherlands).
	6. Elbe „	42	1900 (Germany).
	7. Gota „	47	1832 (Sweden).
	8. Welland „	27.6	1931 (Canada).

Q. 17. Which of the following places are in (1) India (2) Europe (3) North America.

Port Arthur, Cochin, Dusseldorf, Quebec, Prague, Fiume, Melbourne, Yorktown, Montreal, Peru, Vladivostock, Sindri, Skoda, Adyar, Saar and Boston.

Ans. India : Cochin, Adyar, Sindri.

Europe : Dusseldorf, Prague, Saar, Skoda, Fiume.

North America : Quebec, Yorktown, Montreal, Boston.

Q. 18. For what are the following places noted ? :—

(a) Jamshedpur

(e) Pisa

(b) Pilsen

(f) Chicago

(c) Sydney

(g) Sindri

(d) Titagarh

(h) Miami

Ans. (a) Tata Iron and Steel Works.

(b) The Skoda Works, which are large nationalised armament factories and Iron foundries.

(c) Chief station of the Australian navy, and the largest wool-selling centre in Australia.

(d) Paper Manufacture.

(e) A magnificent Cathedral of white marble, which deviates 16 ft. from the perpendicular and is known as the Leaning Tower of Pisa.

(f) Chicago is the greatest Railway Centre of the U.S.A. and also the country's greatest market for grain and livestock. It is also its greatest meat packing centre.

(g) Great Fertilizer Factory in India, recently built.

(h) An important taking off ground for air services to the West Indies and South America. City in Florida, (U.S.A.)

Q. 19. Where do or did the following live ? :—

(1) The Black Jews (2) The Waloons (3) Inca Indians (4) The Maoris (5) Todas (6) The Druids (7) The Vikings (8) Zulus (9) The Bawangamatu Tribe (10) The Basques (11) The Nagas (12) The Karens (13) The Chins (14) The Khasi Tribes (15) The Bantus (16) The Khamli Tribes (17) The Adivasis (18) The Celts (19) The Teutons (20) The Magyars (21) The Slavs (22) The Memelukes (23) The Gauls.

Ans. (1) In Cochin and Kerala States of India (2) Belgium (3) Peru and Bolivia (4) Newzealand (5) In the Nilgiri Hills in India (6) England (7) In Scandinavian countries (8) North East Part of Natal (Africa) (9) Bauchonaland (Africa) (10) In the Pyrenees mountains (11) Assam (12) Burma (13) Burma (14) Assam (15) The Bantus is the term applied to people of various races inhabiting North, Central, and Southern Africa, including such races as the Zulus, Buganda, Swahili and Warundi, speaking the Bantu languages (16) The Khamli tribe lives in Assam (17) The Adivasis are found mostly in Khandesh and Thana districts of Bombay (18) The Celts inhabited Britain, Scotland, Ireland, ancient Gaul (Modern France) and the basin of the upper Danbe and South Germany (19) The Teutons were Germanic tribes inhabiting Germany and countries of the Scandinavian countries north of it (20) The Magyars live in Hungary (21) The Slavs comprising mostly Russians, Czeches, Croats, Poles, Slovans and Bulgars inhabit Eastern Europe (22) The Memlukes lived in Egypt (23) The Gauls lived in France.

Q. 20. Where are the following located in India ?—

- (i) Central Drug Research Institute.
- (ii) National Physical Laboratory.
- (iii) Central Food Technological Research Institute.
- (iv) National Metallurgical Laboratory.

- (v) National Chemical Laboratory.
- (vi) Higher Technological Institute.
- (vii) School of Mines and Applied Geology.
- (viii) Agricultural Research Institute.
- (ix) Central Glass and Ceramic Institute.
- (x) Indian Institute of Philosophy.

Ans. (i) Lucknow (ii) New Delhi (iii) Mysore (iv) Jamshedpur (v) Poona (vi) Kharagpur (vii) Dhanbad (viii) Delhi (ix) Jadevpur (x) Nalanda.

Q. 21. Mention the distinguishing characteristic of the following types of Universities giving examples of each type from India.

- (i) Unitary.
- (ii) Federative.
- (iii) Affiliating.

Ans. In a Unitary type of University there are no colleges. The University does the teaching as well as the examining work and is a compact well knit body located in a city.

Examples : Aligarh Muslim University, Allahabad University, Lucknow University, Patna University, Visva Bharti Santiniketan.

(ii) In a federative university colleges are attached and they take part in running of the University. Under the new act Delhi University is both Federative and Affiliating.

(iii) In the affiliating type of University colleges are attached but the University is only an examining body.

Examples : Agra University, Bihar University Patna, Gujarat University Ahmedabad, Karnatak University Dharwar.

Q. 22. Explain briefly the following :—

- (i) Macadamise
- (ii) Artesian Well
- (iii) Blue Stocking.
- (iv) Fourth Estate
- (v) 38th Parallel

Ans. (i) To macadamise is to use the system of road-making as invented by Job Macadam. According to it, the road bed is laid with hard broken stones, of a nearly uniform size which by the weight of the traffic alone soon assume firmness.

(ii) An artesian well is an artificial boring made through impermeable rock to water containing bed, when the water rises to the surface by hydrostatic pressure or is pumped up.

(iii) Disparaging term for a learned woman.

(iv) The Fourth estate is the name applied to the press.

(v) The famous parallel of longitude which divides South from North Korea and is the demarcation line between the two.

Q. 23. Describe briefly the remains of archaeological interest found in the places mentioned below :—

Locate those places and give the approximate dates of those remains.

(1) Chichen Itza (2) Mohenjo Daro (3) Angkor Wat (4) Taxilla (5) Ur.

Ans. (1) It was an ancient city in Mexico, one of the holy cities of the Mayas, who flourished from 3000 B.C. to the beginning of the Christian era. The principal temple of these people the *El Castillo* was found about the end of the 19th century. It is a gigantic structure on a pyramid with twelve terraces and a great stairway on each side. There are also to be found in it the remains of the *Temple of the Warriors*, and the *Court of the Thousand Columns*.

(2) It is the site of a city on the lower Indus in Sindh, which seems to have been built about 3000 B.C. It reveals to us the Indus valley civilization. There have been unearthed complete and well planned cities, and sculptures in alabaster and marble ; jewellery, as well as tablets engraved with animal devices and pictographic legends. These people seem to have been engaged in agriculture and cattle rearing, spinning, weaving and manufacture of cotton goods etc.

(3) Angkor Wat is an assemblage of ruins in and around the ancient capital of the Khmers in Cambodia. Angkor Wat was a Hindu Temple built about the 12th century A.D., and is one of the most imposing edifices in the world.

(4) Taxilla is a small village in the Rawalpindi district in West Pakistan. Here was excavated, in the early years of this century, the ruins of the famous Taxilla town, whose university attracted scholars from all over India and abroad. Jewellery, coins of various kinds and ages, house-hold objects and pottery were unearthed. These relate to a period about the beginning of the Christian era.

(5) This was an ancient city in Mesopotamia, about 140 miles from Babylon on the Euphrates. Excavations have shown that it was inhabited about 3,500 B.C. Many temples, specially the great ziggurat, tombs and inscriptions have been found there.

Q. 24. Which are natural habitat of :—

(1) The Kangaroo (2) The Ostrich (3) Caribou (4) Rhinoceros (5) Giraffe (6) Wallaby (7) Rhea (8) Jaguar (9) The Coral Snake (10) Rattlesnake.

Ans. (1) Australia (2) Africa and Arabia (3) The Arctic districts of the New and Old World (4) Sumatra, Africa (5) The Sahara (6) Tasmania, Australia (7) South America (8) America, specially Mexico (9) South America (10) In the two Americas.

Q. 25. What industries are associated with the following towns ?

- | | |
|---------------|--------------|
| (i) Detroit | (iv) Sialkot |
| (ii) Dindigal | (v) Raniganj |
| (iii) Baku | |

Ans. (i) Car manufacture (ii) Cigars and Tobacco (iii) Petroleum (iv) Sports (v) Coal.

Q. 26. What are the capitals of the following countries ?—

- | | |
|---------------|--------------|
| (a) Guatemala | (d) Colombia |
| (b) Ukraine | (e) Portugal |
| (c) Hungary | |

Ans. (a) Guatemala city (b) Kieve (c) Budapest (d) Bogota (e) Lisbon.

Q. 27. Name the most useful product obtained from each of the following :—

- | | |
|-----------------|--------------|
| (a) Molasses | (f) Lac |
| (b) Cow-dung | (g) Bauxite |
| (c) Cellulose | (h) Aniline |
| (d) Cotton-seed | (i) Woodpulp |
| (e) Resin | (j) Sand |

Ans. (a) Sugar and alcohol (b) Manure (c) Artificial silk (d) Vanaspati ghee (e) Varnishes and soap (f) Lac gives us the commercial shellac (g) Bauxite yields the metal aluminium (h) Aniline is of great importance as a source of dyes (i) Paper and artificial silk (j) Sand is widely employed for the manufacture of glass, concrete, mortar etc.

Q. 28. (a) What is a Multipurpose Development Project ?

(b) What are the main features of the Bhakra Dam Project ?

Ans. (a) The multipurpose projects such as we now have in India, as those which are designed to provide for irrigation, hydro-electric power, flood control, navigation, prevention of soil erosion, recreation facilities and fish culture etc.

(b) The Bhakra dam project across a gorge in the river Sutlej comprises a dam 680 ft. high about fifty miles above Rupar in the Ambala district. Its main features are :—

(1) A lake spread over an area of 38,000 acres which will store 15 million acre-feet of water has been formed. This will provide 6600 cubic feet of water per second for a period of about nine months during the dry part of the year.

(2) About 200 miles of lined canals and a net-work of distributaries have been dug out which will irrigate about 6.6 million acres of land.

(3) Hydro-electric power will be generated to about 4 lakh K.W. which will electrify about 150 towns in Punjab, Rajasthan, and Delhi. Extension of supply of tube-wells to rural areas, including un-commanded areas is one of the special features of the project.

Q. 29. Mention the countries in which the following towns are situated :—

(a) Tirana (b) Cardoba (c) Cherbourg (d) Osaka (e) Ghent (f) La Paz (g) Rio-de-Janeiro (h) Durban (i) Vancouver (j) Jaffa.

Ans. (a) Albania (b) Argentina (c) France (d) Japan (e) Belgium (f) Bolivia (g) Brazil (h) Union of South Africa (i) Canada (j) Palestine.

Q. 30. Where are the following places ? In whose possession are they ?

(a) Peking (b) Bandung (c) Berlin (d) Vipuri (e) Oslo (f) Westphalia (g) La Paz (h) La Havere (i) Fez (j) Dunkirk (k) Croydon.

Ans. (a) China. Peoples Republic (Communist).

(b) Java. Indonesian Republic.

(c) Germany, one sector was under U.S.S.R., though now handed over to E. Germany, and the other under U.S.A., Britain and France,

(d) U.S.S.R.

(e) Norway.

(f) In Prussia (Germany).

(g) Bolivia.

(h) France.

(i) Morocco.

(j) France.

(k) England.

Q. 31. What are the chief agricultural products of ? :—

(a) East Punjab

(d) Bombay State.

(b) West Bengal

(e) Kerala State.

(c) Uttar Pradesh

Ans. (a) Wheat, gram, bajra and sugarcane.

(b) Jute and rice.

(c) Wheat, sugarcane and pulses.

(d) Cotton, groundnuts, jowri and bajra.

(e) Rice, tapioca, gram, pepper, cardamom,

Q. 32. In what countries do the following rivers rise ?

(a) Brahmaputra (b) Mississippi (c) Amazon (d) The Blue Nile (e) Danube (f) Tigris (g) Rhine.

Ans. (a) Tibet (b) In Lake Itasca, Minnesota U.S.A. (c) The Andes mountain in Peru (d) Abyssinia (e) Germany (f) Kurdistan, Iraq (g) Switzerland.

Q. 33. Where are ? :—

(a) The highest annual rainfall district in India.

(b) The highest peak of the Himalaya.

(c) The largest artificial lake in India.

(d) The largest barrage in India.

(e) The largest railway bridge in India.

(f) The most densely populated tract in India.

(g) The largest sugarcane producing State in India.

Ans. (a) Cherrapunji in Assam (b) Nanda Devi in the Kumaon district (c) Marikanive Lake in the Mysore State (d) Lloyd Barrage, Sukkur, now in West Pakistan (e) Sone Bridge (f) The region south of the Himalayas watered by the Ganga and its tributaries (g) Uttar Pradesh.

Q. 34. Where are the following and for what are they known ?

(a) The Nakdong River (b) Ellora (c) Bahrein Islands (d) Quai-D'Orsay (e) Dehra Dun (f) Sarnath (g) Sanchi (h) Scapa Flow (i) Stonehenge (j) Luxor.

Ans. (a) A river in South Korea which was the scene of most determined and bloody encounters between the North Koreans and the U.N. forces.

(b) A village near Hyderabad Deccan, famed for its Buddhist and Hindu Cave and monolithic temples, the most beautiful of which is the Kailas temple.

(c) These islands form an archipelago off Arabia's east coast. Centre of the Persian Gulf pearl fisheries and the site of airport on the London—Australia route.

(d) Quay on the south side of the river Seine in Paris. Here are situated the buildings which house the French Department of Foreign Affairs.

(e) A town at the foot of the Mussorie hills in Uttar Pradesh. It is the headquarter of the forest department of India. It has also a military academy.

(f) A town in Uttar Pradesh near Banaras, known for its Buddhist temples and remains.

(g) It is an expanse of water south of the Orkney Islands, Scotland, and was the main base of the British fleet during the 1st World war. In 1919 it was the scene of the scuttling of 71 surrendered German warships.

(i) Britain's greatest prehistoric monument on Salisbury Plain. It consists of two concentric circles enclosing two ellipses. The stones are from 13 ft. to 29 ft. high.

(j) A town in Upper Egypt, the site of imposing ruins of ancient temples, palaces, tombs, statues of colossal size, and sphinxes.

Q. 35. What and where are the following, and why are they chiefly noted for ?—

(a) Amarnath

(f) Triveni

(b) Asansol

(g) Sindri

(c) Bangalore

(h) Mukhtesar

(d) Dhanbad

(i) Digboi

(e) Buland Darwaza

(j) Mirzapur.

Ans. (a) Amarnath is a grand natural cave in Kashmir at a height of about 12,000 ft. and about 70 miles from Srinagar. During August of each year, thousands of Hindu pilgrims, headed by parties of sadhus, come for *darshans* of Shiva and Parbati images formed by the natural freezing of water which drips from the roof of the cave.

(b) Asansol is a town in West Bengal. Near here is the great Chittaranjan Locomotive Manufacturing Works.

(c) Bangalore is the capital of Mysore. It is a great industrial town, most important industries are : artificial silk and the aircraft manufactures. It has many Scientific, Industrial and Research institutes, e.g., Indian Institute of Science, Indian Dairy Research institute, Laboratory of the Indian Academy of Sciences, Raman Research Institute etc., etc.

(d) Dhanbad in Bihar has the National Fuel Research Institute, the School of Mines and the famous Jharia Coal Mines.

(e) Buland Darwaza is the massive triumphal archway at the southern gate of the Jama Masjid, Fatchpur Sikri, of marble and sandstone, built by Akbar to commemorate his victory of Gujrat.

(f) Triveni is the meeting or Sangam of the Ganga and Jumna and the legendary Saraswati, near Prayag (Allahabad). Every twelfth year the famous Kumbh Mela is held here.

(g) Sindri, in Bihar, contains the great artificial fertilizers factory.

(h) Mukhtesar in U.P., famous bathing place of Hindu Pilgrims.

(i) Digboi in Assam, contains the only oil field in India.

(j) Mirzapur in U.P. is well known for its carpet manufactures.

Q. 36. State the country of origin of the following :—

(a) Sherry

(d) Chianti

(b) Gorgonzola

(e) Tobacco

(c) Potato

(f) Caviare.

Ans. (a) Sherry originated in Spain (b) Gorgonzola in Italy (c) Potato in South America (d) Chianti in Italy (e) Tobacco is a native of America (f) Caviare comes from the Black and Caspian Seas.

Note. It will be interesting to the reader to note that the Sherry wine is obtained from grape-juice extensively grown in the region surrounding Jerez de la Frontera in Spain. Gorgonzola is the cheese obtained from the city of this name in Italy. Chianti is the wine from the wines of Chainti hills in Italy. Tobacco is said to have been brought to England from America by Sir Walter Raleigh and thence its use spread to Europe. Caviare are the roe or immature ovaries of the common strudeon and other kindered fishes caught in the Black and Caspian seas.

Q. 37. To which countries do the following monetary units or terms relate ? :

(a) Peseta

(e) Cent

(b) Franc

(f) Dime

(c) Tael

(g) Guinea

(d) Mark

Ans. (a) Peseta

...Spain

(b) Franc

...France

(c) Tael

...China

(d) Mark

...W. Germany

(e) Cent

...U.S.A. and Canada

(f) Dime

...U.S.A

(g) Guinea

...Britain

Q. 38. State what the following are viz., bird, animal, fish or plant.

(a) Mallard

(e) Nettle

(b) Porcupine

(f) Seal

(c) Ostrich

(g) Dromedry

(d) Larch

(h) Marmot.

- Ans. (a) Mallard is a bird (wild Duck)
 (b) Porcupine „ „ rodent animal
 (c) Ostrich „ „ bird
 (d) Lerch „ „ plant
 (e) Nettle „ „ „
 (f) Seal „ „ a marine mammal
 (g) Dromedary „ „ animal
 (h) Marmot „ „ „

Q. 39. Name the states which constitute the Republic of India.

Ans. East Punjab, Uttar Pradesh, Assam, Madras, Orissa, Bombay, Bihar, Madhya Pradesh, West Bengal, Rajasthan, Kerala, Andhra, Mysore, Jammu and Kashmir State.

Q. 40. Where in Bharat would you find the following ?

- (1) Gold (2) Lac (3) Jute (4) Tea (5) Sandalwood
 (6) Coffee (7) Iron and steel (8) Pearls (9) Cinchona and
 (10) Rosewood.

Ans. Gold. Kolar mines in Mysore.

Lac. Chhota Nagpur, M. P., Assam, Bengal, and Gujrât.

Jute. West Bengal, Assam and Orissa.

Tea. Darjeeling, Assam, Madras, the Kangra district, Dehra Dun and the Nilgiri hills.

Sandalwood. Mysore and the adjoining parts of South India.

Coffee. Kerala Mysore, Cochin and the Nilgiris.

Iron and Steel. Jamshedpur (Tata Iron and Steel Works); at Hirapur, near Asansol (Indian Iron and Steel Co. & Scob), Bhadravati in Mysore, Singhbhum district of Mayurbhanj, East Godavari district.

Pearl. Pamban.

Cinchona. Nilgiris, Mysore, Kerala and Darjeeling.

Rosewood. Peninsular India and Nepal.

Q. 41. (a) Which State in Bharat has the largest number of jute mills ?

(b) Which State in Bharat manufactures the largest quantity of sugar ?

(c) Which State in Bharat has the production of shawls as its chief industry ?

(d) Which state in Bharat has the largest number of canals in it ?

(e) Which part of Bharat produces the largest amount of coal ?

(f) Which part of India has an annual rainfall of 5 inches and a population of approximately 5 people per square mile ?

Ans. (a) West Bengal (Calcutta) (b) Uttar Pradesh (c) Kashmir (d) Uttar Pradesh (e) Bihar (f) The Desert border line of Rajputana, specially the state of Jaisalmer.

Q. 42. Explain briefly what causes the following ? :—

(a) Typhoon (b) an earthquake (c) a desert (d) a delta (e) Ocean tides (f) Eclipses of the sun.

Ans.. Typhoons are violent winds blowing in the China seas during the summer months of July, August and September, due to the great heating of the land mass, which rarefies the atmosphere above it, and makes the heavier air in the comparatively cooler ocean regions rush to fill this vacuum and cause the violent typhoons.

(b) Earthquakes are caused either by the collapse of the earth's crust under the pressure exerted by the cooling of the earth's interior or when the sea water gets into the deeper parts of the earth's crust and the steam together with the volcanic lava that burst out cause violent tremors in the earth's surface.

(c) Deserts are caused by excessive heat and extremely low rainfall, generally less than 10 inches annually.

(d) A river in its lower parts becomes very slow and the mud and silt that it brings are held in suspension and sink to its bottom. When it enters a comparatively tideless sea, the deposit goes on accumulating and gradually fills up the opening through which it flows. This deposit in course of time rises above the surface and the river forces its way by several channels to the sea. This triangular formation between the extreme channels is called a delta.

(e) Ocean tides are caused by the gravitational force of the moon, and to a lesser extent of the sun on the waters of the oceans.

(f) Eclipses are caused by the obscuring of a heavenly body by the intervention of another heavenly body between it and the observer, in particular when the moon passes between the sun and the earth when it may obscure the whole or part of the sun's disc.

Q. 43. Name the seven wonders of the world, and mention the names of the countries in which they are or were to be found.

43. (1) Pyramids in Egypt (2) Hanging gardens of Babylon (3) The tomb of Mausolus of Caria in Asia Minor (4) The Colossus of Rhodes (5) The temple of Diana at Ephesus (6)

The statue of Jupiter at Olympia by Phidias in Greece (7) The Pharos (lighthouse) at Alexandria in Egypt.

Q. 44. Where are the following :—

(a) **Tirra del Fuego** (b) **Timbuctoo** (c) **Montreal** (d) **Pearl Harbour** (e) **Diamond Harbour** (f) **Port Morseby** (g) **Port Said** (h) **Port Arthur** (i) **Port of Spain** (j) **Port Louis**.

Ans. (a) Tierra del Fuego is an island group at the southern extremity of south American continent separated by the strait of Magellan.

(b) A city of French Sudan, situated at the edge of the Sahara.

(c) The largest city of the Dominion of Canada at the junction of the Ottawa and St. Lawrence rivers.

(d) It is an inlet in the island of Oahu, Hawaii in the Pacific.

(e) Seaport on the river Hoogly about 40 miles below Calcutta.

(f) Capital and port of New Guinea island in the Pacific.

(g) Port at the northern entrance of the Suez Canal.

(h) Port and naval base of Manchuria, China.

(i) Port and capital of Trinidad in the British West Indies.

(j) Chief port and capital of Mauritius island.

Q. 45. Name the countries which have :—

(a) **The Monsoon type of climate.**

(b) **The China type of climate.**

(c) **The Mediterranean type of climate.**

Ans. The Monsoon type of climate. India, South China, Malaya, Burma, Indo-China in the East, and the West Indies, the coast lands of Mexico and central America in the West.

The China type of Climate. Central China, south eastern part of the United States, the south east coast of Brazil and Uruguay in Latin America and Natal and Mozambique in Africa, as also the east coastal lands of Australia.

The Mediterranean type of climate. In countries bordering on the Mediterranean sea in Europe, southern tip of Africa, the southern part of Australia, Tasmania and New Zealand, and in California.

Q. 46. Where are the following places and what is their historical importance ?—

(a) **Harappa**

(b) **Sanchi**

(c) **Kausambhi**

(d) **Fatehpur Sikri**

(e) **Chitor.**

Ans. *Harappa.* Town in the Montgomery district of Pakistan. Famous for its excavation of prehistoric buildings which are

supposed to be that of a city built in pre-Aryan days belonging to the period of Indus-Valley civilization that flourished about 3500 B. C.

(b) *Sanchi*. A village in Bhopal State on the rail route from Bombay to Delhi. It has the largest and best preserved of Buddhist stupas in India (203 ft. in diameter and 42 ft. high) built in the third century B. C.

(c) *Kausambhi*. One of the towns of ancient India near Allahabad on the Jamuna. It was also a riparian port. We read of it as the capital of the royal race of the Kurus who ruled over a powerful kingdom which survived till the rise of Buddhism.

(d) *Fatehpur Sikri*. A lone and deserted city about 26 miles from Agra, built by Akbar in 1569 as a token of thanks-giving. Here lies the tomb of the Muslim saint Salim Chisti who foretold the birth of a son to Akbar. Abandoned for scarcity of water about fifty years after Akbar's death.

(e) *Chitor*. Ancient capital of Udaipur state in Rajasthan. Every stone of it has behind it some tale of heroism and romance. Has the famous Tower of Victory built by Rana Kumbha.

Q. 47. Where are the following places and why have they recently become well known ?

(a) *Abadan*.

(d) *Haslingden*.

(b) *Pan Mun Jon*.

(e) *Sindri*.

(c) *Helsinki*.

Ans. (a) *Abadan* is a modern town and port in Persia on the left bank of the Shatt el Arab, about 40 miles from its north on the Persian Gulf. It is terminus of pipeline brought by the now defunct Anglo-Iranian Oil Company from Masjid-i-Sulaiman, about 137 miles up-country. It has sprung into prominence because the ex-premier of Persia, Dr. Mosaddeq, closed the Anglo-Iranian Company and nationalized this great venture. This act had been the subject of great dispute between England and Persia.

(b) *Pan Mun Jon*. Town in north Korea near the border where parleys between the North Koreans and the Chinese on the one hand, and the representatives of the U. N. on the other hand, took place over the tangled question of repatriation of prisoners of war.

(c) *Helsinki*. Capital of Finland. Here were held the famous Olympic Games.

(d) *Haslingden*. Town in Lancashire, England, famous for its cotton and Engineering industries.

(e) *Sindri*. Town in Bihar on the Damodar. Famous for the new government built Fertilizer factory.

Q. 48. Give an approximate idea of the Indian population overseas in any four of the following countries of the Commonwealth :—

- | | |
|--------------------|-------------------------|
| (a) Ceylon | (e) Mauritius |
| (b) Kenya | (f) Trinidad and Tobago |
| (c) South Africa | (g) British Guiana |
| (d) British Malaya | (h) Fiji Islands |

Ans. Approximate number of Indians in the following four countries is

(a) Ceylon	900,000
(b) Kenya	45,000
(c) South Africa	282,400
(d) British Malaya	615,000

Note. For the information of the reader we give below the number of Indians in other countries mentioned in this question.

Mauritius	270,000
Trinidad and Tobago	162,000
British Guinea	143,000
Fiji Islands	150,000

Q. 49. With which industries are the following places associated ?—

- (a) Srinagar (b) Madurai (c) The Kulu Valley (d) Kanpur
 (e) Surat (f) Bombay (g) Calcutta (h) Coventry (i) Dundee
 (j) Lyons (k) Witwatersrand and (l) Bordeaux.

Ans. (a) Srinagar : Woollen shawls, silk, Paper Machie, blankets and nambdas.

(b) Madurai : Silk goods

(c) Kulu Valley : Fruits, specially French apples

(d) Kanpur : Textiles and leather industry

(e) Surat : Silk brocade and embroidery

(f) Bombay : Textiles

(g) Calcutta : Jute goods, paper, electrical goods etc.

(h) Coventry : Cycle trade

(i) Dundee : Jute and linen Manufacture

(j) Lyons : Silk industry

(k) Witwatersrand : Gold mining

(l) Bordeaux : Wine

Q. 50. Name a port on each of the following seas.

1. The Baltic sea 2. The White Sea 3. The Black Sea 4. The Adriatic sea 5. The Red sea 6. The sea of Japan 7. Arabian sea 8. The North sea.

Ans. (1) Koningsberg (2) Archangel (3) Batum (4) Venice (5) Aden (6) Chefoo (7) Karachi (8) Amsterdam.

Q. 51. Where are the following and with what do you associate them ? :—

(a) Shiraz (b) Cognac (c) Canberra (d) Blenheim (e) Valdivostok (f) Calvary (g) Chitorgarh (h) El Dorado (e) Marathon.

Ans. (a) A town in Iran, noted for its wines and silverwork. The city is associated with the great Persian poet Saadi of which it has the honour to be the birth place.

(b) A town in France noted for its world-famous brandy.

(c) Capital of the Commonwealth of Australia. The first Parliament of the Commonwealth was opened here in 1927.

(d) A town in Bavaria (Germany), which has become famous on account of the victory of Marlborough in 1704 over the French and Bavarians.

(e) It is a Russian port in its Far Eastern Region on the sea of Japan and is its most important naval and commercial centre. It is the eastern terminus of the great Trans-Siberian Railways.

(f) Hill outside Jerusalem, Palestine, believed to be the scene of Christ's crucifixion.

(g) Ancient capital of Udaipur, famous in Rajasthan history. Has an old fortress and Mira Bai's temple.

(h) Town in Arkansas, U. S. A., originally an imaginary "city of gold" supposed to exist somewhere in Central America by the early Spanish explorers.

(i) Plain of Greece. Famous for the battle fought here in 490 B. C. resulting in Greek victory over Persian hordes under Darius.

Q. 52. Name at least one important commercial product connected with :—

(a) Srinagar (b) Java (c) Amritsar (d) Rumania (e) Wah (f) Baku (g) Sicily (h) Calcutta (i) Newfoundland (j) Bombay (k) Sweden.

Ans. (a) Shawl manufacture (b) Sugar (c) Kashmere Shawls (d) Petroleum (e) Cement (f) Petroleum (g) Sulphur (h) Jute manufacture (i) Fish oil (j) Textile manufactures (k) Wood-pulp and matches.

Q. 53. With what countries do you connect the following :—

(a) Alpaca (b) Aye-Aye (c) Canary (d) Gorilla (e) Orang Otang (f) Tsy-Tsy fly (g) Yak (h) Zebra.

Ans. (a) Bolivia, Chile and Peru (b) Madagascar (c) Canary and Azores Islands (d) Equatorial Africa (e) Borneo and Sumatra (f) Tropical Africa (g) Tibet (h) Africa (Abyssinia and Somaliland).

Q. 54. Which of these are inland seas :—

The Caspian, Sea of Azov, Dead Sea, Sea of Marmora, Sargasso sea.

Ans. Caspian, Dead Sea.

Q. 55. Of these African rivers which flows into :—

(a) Atlantic (b) Indian Ocean (c) Mediterranean, Congo ; Niger ; Zambezi ; Limpopo ; Orange River ; The Nile.

Ans. Atlantic Ocean—Congo, Niger, Orange river.

Indian Ocean—Zambezi and Limpopo.

Mediterranean—Nile.

Q. 56. Which of these touch (a) the west and (b) the east coast of Africa.

Nigeria, Sierr Leone, Gold Coast Colony, Kenya, Tanganyika Territory, Somaliland.

Ans. (a) Nigeria, Sierr Leone, Gold Coast Colony.

(b) Kenya, Tanganyika, Somaliland.

Q. 57. On which islands are these volcanoes :—

(a) Etna (b) Heckla (c) Stromboli (d) Mt. Pellee (e) Fujiyama (f) Mauna Loa (g) Lamington.

Ans. (a) Sicily (b) Iceland (c) Lipari (north of Sicily) (d) Martinique (e) Nippon (south west of Tokyo) (f) Hawaii (g) New Guinea.

Q. 58. What is the present name of ? :—

(i) Mesopotamia (ii) Formosa (iii) Manchukuo (iv) Persia (v) Constantinople (vi) The United Provinces of Agra and Oudh (vii) Petrograd (viii) Nijninovograd (ix) Helsingfors and (x) Angora.

Ans. (i) Present name of Mesopotamia is *Iraq* (ii) of Formosa *Taiwan* (iii) of Manchukuo, *Manchuria* (iv) of Persia, *Iran* (v) of Constantinople, *Istambul* (vi) of the United Provinces of Agra and Oudh, *Uttar Pradesh* (vii) of Petrograd, *Leningard* (viii) of Nijninovograd, *Gorky* (ix) of Helsingfors, *Helsinki* (x) of Angora. *Ankara*.

Q. 59. With what famous persons are the following places associated?—

(a) Santiniketan (b) Bethelhem (c) Gaya (d) Assisi (e) Corsica (f) Shiraz (g) Runnymede.

Ans. (a) Santiniketan with Ravindra Nath Tagore (b) Bethelhem with Jesus Christ (c) Gaya with the Buddha (d) Assisi with St. Francis (e) Corsica with Napoleon Bonaparte (f) Shiraz with Sheikh Saadi ; also with the great Persian poet Hafiz (g) Runnymede with King John for signing the great Magna Carta.

Q. 60. State what the following are and where they are situated :—

A. (a) The Bridge of Sighs (b) The Cenotaph (c) The Alhambra (d) Ankor wat (e) The Death Valley (f) Notre Dame (g) Sing Sing (h) Skoda.

B. Name the following :—

- (a) The highest mountain peak.
- (b) The Longest Planetary body.
- (c) The most magnificent gate in India.
- (d) The longest Delta.
- (e) The most populous Continent.
- (f) The largest single country.
- (g) The largest palace in the world.
- (h) The standard coin of the Russian currency.
- (i) The longest group of Islands.
- (j) The longest tunnel.

C. What is the historical importance of ? :—

- (a) Ajanta Frescoes
- (b) Gomateswara
- (c) Hampi
- (d) Fatehpur Sikri
- (e) Kutab Minar

Ans. A. (a) A covered way in Venice, which connects the palace of the doge with the state prison. Prisoners were conveyed from the judgement hall to the place of execution through this passage, whence the name.

(b) The Cenotaph is a memorial to the dead of the Great War (World War first) in the Whitehall in London.

(c) Alhambra is the palace of the Moorish Kings at Granada which they built during the 13th century A. D.

(d) Angkor Vat is the great temple of Angkor in Cambodia—one of the most imposing edifices of the world. It is one of the ruins in Angkor.

(e) Death Valley is the hottest and lowest valley in California, U. S. A.

(f) *Notre Dame* is the Cathedral Church of Paris completed in 1300 A. D. after 150 years of uninterrupted work. It stands on the river Seine.

(g) Sing Sing is the famous prison of the U. S. A. where prisoners condemned to death are electrocuted.

(h) Skoda are large nationalized armament factories and iron foundries at Pizen in Czechoslovakia.

B. (a) Mount Everest (b) Jupiter (c) The Buland Darwaza, Fatehpur Sikri (d) The Gangetic Delta (e) Asia (f) Brazil (g) The Vatican in Rome (h) Rouble (i) The Malaya archipelago (j) The Simplon tunnel in Switzerland.

C. (a) The fresco-paintings on the walls and ceilings of the Ajanta cave are of great historical interest because they show that the art of painting had reached its height of glory and splendour during the Gupta period when they were mostly drawn. Also as they depict sacred objects and symbols and incidents connected with the life of the Buddha as related in the *Jataka* stories, it is quite evident that Buddhism was still a living force in India during this age. They thus possess great historical importance.

(b) It is the colossal statue of the Jain saint Gomatesvara at Seravana Belagola (Mysore), erected, by a minister of the Ganga king Raja Malla (IV) in 984 A. D. which shows that the Ganga kings were great patrons of the Jains. As they ruled for about 7 centuries (4th to 11th) in the region now known as Mysore, this religion must have flourished in that part of the Deccan during their rule.

(c) Hampi is the site of the ruins of Vijayanagar, the ancient capital of the great Vijayanagar empire that fell to pieces on its defeat at Talikota in 1565—a mute witness to the act of vandalism at the hands of man. The ruins are virtually a vast open air museum of Hindu monuments in the Dravidian style of architecture and cover about 9 square miles.

(d) *Fatehpur Sikri*. Though now a lone deserted city in ruins, this was once a magnificent city built by Akbar about twenty six miles from Agra as a token of thanks-giving for his conquest of Gujerat. Historically it has another importance in that it contains the tomb of the Muslim saint Salim Chisti who pretold the birth of a son to Akbar—the future prince Salim.

(e) The Kutab Minar in Delhi has historical associations in that it is said to have been built to commemorate the conquest of India by the early Slave Kings.

Q. 61. What are the following famous places in and near Rome :—

(a) Collosseum (b) Partheon (c) Via dil Imperio (d) Appian way (e) Quirinal Palace (f) Ostia.

Ans. (a) Ancient arena (b) Circular Church, formerly a pagan temple (c) A monumental thoroughfare (d) Main road south from the city (e) Former Palace of the King of Italy (f) Ancient port, now seaside resort.

Q. 62. What is or was the official residence of the ? :—

(a) Kings of Scotland (b) Kings of France (c) Kings of Itlay (d) Emperors of Austria (e) Popes of Roame (f) President of U.S.A.

Ans. (a) Hollyrood House (b) Louvre (afterwards the Tuilleries), (c) Quirinal Palace (d) Hofburg (e) Vatican (f) White House.

Q. 63. Which of these countries have been or is called ?

(a) Albany (b) Nippon (c) Cathay (d) Hellas (e) The Netherlands (f) Mascovy (g) Soumi (h) Espana (i) Helvetia (j) Magyaroszag and (k) Deutschland.

Ans. (a) Scotland (b) Japan (c) China (d) Greece (e) Holland (f) Russia now the U. S. S. R. (g) Finland (h) Spain (i) Switzerland (j) Hungary (k) Germany.

Q. 64. What and where are these ? :—

(1) Blue Mountains (2) Blue River (3) The Emerald Island (4) Key to the Mediterranean (5) The key to India (6) Wilderness of bamboo and paper (7) The Garden of South India (8) The Sorroa of China (9) The Granite City (10) City of the Motor Cars.

Ans. (1) Nilgiri Hills in Bharat (2) The Yangtse Kiang in China (3) Ireland (4) Gibraltar at the Southern tip of Spain (5) Herat in West Afghanistan (6) Tokyo, capital of Japan (7) Tanjore in South Bharat (8) The Hwang Ho river in China (9) Aberdeen in Scotland (10) Detroit in U. S. A.

Q. 65. Which of the following countries are included in Scandanavia ?

Norway, Lapland, Denmark, aweden, Finland, Holland.

Ans. Norway, Denmark and Sweden.

Q. 66. Which of these is the largest diamond in the world ? :—

The Hope, The Koh-i-Noor, The Excelsior, The Star of India, The Star of Africa, The Cullinan.

Ans. The Cullinan.

Q. 67. Which is or has been called :—

(1) City of David (2) City of Destruction (3) City of Golden Gate (4) City of the Prophet (5) City of the Seven Hills (6) The Celestial city (7) The Eternal city (8) The Granite city (9) The Holy city (10) The Imperial city (11) The Puritan city (12) The Windy city (13) The city of Marston (14) City Dreadful Night (15) City of God (16) City of Refuge (16) City of Palaces.

Also state why some of the above are so called.

Ans. Jerusalem is called the city of David in compliment to King David. (2) The world of the unconverted was called the city of Destruction by Bunyan in his *Pilgrim's Progress*. Christian flees from it to the "Celestial City"; (3) San Francisco is called the city of the Golden Gate; (4) Medina is called the city of the Prophet; (5&7) Rome is called the city of the Seven Hills as it is built on seven hills; Rome is also called the Eternal city; (6) Heaven is called the Celestial city by Bunyan in his *Pilgrim's Progress*; (8) Aberdeen is called the Granite city; (9) Jerusalem, Banaras, Mecca; (10) Rome was called the Imperial city, being the seat of the Roman Empire; (13) Leningrad is called the Marsh city on account of its low lying situation and frequent floods; (12) Boston in U. S.A. is so called because it is the metropolis of the Puritan settlement of New England; (12) Chicago is called the windy city from its stiff lake breezes; (14) The City of Dreadful Nights is the title of a poem by James Thompson; (15) The Christian church is called the city of God. This phrase was originated by St. Augustine, one of whose works bore that title; (16) Medina was called the city of Refuge as it gave shelter to Mohamamad when he was driven to it by a plot against his life; (17) Calcutta is called the city of Palaces.

Q. 68. Explain the following briefly :—

(1) Milky Way (2) Ecliptic (3) Isobars (4) Isotherms (5) Apogee (6) Zodiac (7) A lagoon (8) Geyser (9) A Barrier Reef (10) Solstice.

Ans. (1) The Milky Way is the belt of stars in which the stars appear to cluster more thickly than elsewhere. (2) Ecliptic is the name given to the circular path in the heavens around which the sun appears to move in the course of a year. (3) Lines drawn on maps and weather charts linking all places which have the same atmospheric pressure. (4) All the places on a map which have the same temperature at a given time or over a given period. (5) That point on the orbit of the moon when it is farthest from the earth. (6) "The name given to a belt of the heavens extending 8° on each side of the ecliptic containing twelve constellations called signs of the Zodiac, which the sun traverses in the course of a year" (7) A lagoon is a shallow lake communicating with the sea, but separated from it by a bar or

sand-spit. (8) A natural spring, which, at more or less regular intervals, explosively discharges into the air a column of steam or hot water. Examples :—

The famous Great Geyser near Reykjavik in Iceland and the geyser in Yellowstone National Park, U. S. A. which frequently emits jets upto 250 ft. or even more. (9) Coral reefs off the mainland, as the coral reefs off the coast of Queensland, which protect the intermediate channel from the storms of the ocean. (10) Either of the two points on the ecliptic at which the sun is farthest distant north or south from the equator.

Q. 69. What do the following flags indicate :—

(a) A black flag (b) A white flag (c) A white flag on the railways (d) A red flag (e) A red flag on the railways (f) A yellow flag (g) A green flag on the railways (h) When the flag is hung half mast high (i) when a flag is lowered.

Ans. (a) A black flag is the emblem of piracy, or when no quarter is given (b) A white flag is the flag of truce or surrender (c) A white flag on railway indicates that the line is clear and the driver can go ahead (d) A red flag is the flag of defiance used by rebels (e) On a railway line the red flag is the signal that there is danger ahead (f) A yellow flag is hoisted on board a ship to indicate that a contagious disease has broken out (g) A green flag on railways signifies that the driver should go slow (h) when a flag is half mast, it is so, being in token of mourning for some distinguished person (i) when a flag is lowered it indicates one's admission of defeat or being in the wrong.

Q. 70. (1) Which is the largest river in Europe (2) which is the largest river in the world (3) which is the largest continent (4) which is the smallest continent (5) which is the best natural harbour in the world (6) which lake is the largest in the world ?

Ans. (1) Volga (2) Amazon (3) Asia (4) Australia (5) Portsmouth (6) Caspian.

Q. 71. On what rivers are the following situated :—

(1) Srinagar (2) Lahore (3) Patna (4) Allahabad (5) London (6) Paris (7) Delhi (8) Rome (9) Calcutta (10) Kanpur (11) Sindri.

Ans. (1) Jhelum (2) Ravi (3) Ganga (4) On the confluence of Ganga and Jamuna (5) Thames (6) Siene (7) Jamuna (8) Tiber (9) Hoogly (10) Ganga (11) Damodar.

Q. 72. Where in Bharat would you find—

(a) Moplas (b) Santhals (c) Todas (d) Bhils (e) Nairs (f) The Bhotias (g) The largest populations of Scheduled Tribes (h) The Ahoms.

Ans. (a) Malabar in Madras (b) Orissa (c) Nilgiri hills (d) In the Satpura Hills and Satmala (e) Madras districts specially Karnatak (f) Bhotias live in the Himalayan region in valleys bounded on the north by the snow capped mountains, on the east by Nepal and on the west by Tehri-Gharwal (h) The Scheduled Tribes are concentrated mostly in the states of Bihar, Bombay, Orissa, Madhya Pradesh, West Bengal, Madras and Rajasthan (i) Ahoms in Assam.

Q. 73. (a) Why is Assam particularly liable to earth-quakes and not the plateau of Deccan.

(b) Name the countries that border on Kashmir to bring out clearly its strategic importance ?

Ans. (a) Geologically and seismologically Assam is the most unstable region in India, for it lies along the geological fault line along the foot of the Himalayas and the northern Assam ranges.

The Himalayas are the youngest mountains existing in the world and their elevated rocks have not yet attained stability. The elevation of 1,600 miles long mountain range, 250 miles broad, is a heavy strain on the rocks which occasionally slip off under the strain and cause earthquakes. In contrast to Assam, the Deccan tableland is geologically among the most stable and soundest area in the world and hence an earthquake is not heard of there.

(b) The countries that border on Kashmir are the following :

(1) India in the south (2) Pakistan in the south west (3) Afghanistan on north west (4) U. S. S. R. on north and north west (5) Chinese Sinkiang on north east (6) Tibet in east and south east.

Q. 74. What are the following places known for ?

(a) Versailles

(b) Elba

(c) Nalanda

(d) Mohenjo Daro.

(e) Flushing Meadows.

(f) Reykjavik.

(g) Dum-Dum.

(h) Gettysberg.

(i) Noakali.

(j) Falklands.

(k) Wake islands.

- Ans.** (a) **Versailles** : French town, famous for its royal palace. Here was signed the Treaty of Versailles in 1919.
- (b) **Elba** : Island off the Mediterranean Sea ; belongs to Italy. Here Napoleon lived in exile, May 1814 to February 1815.
- (c) **Nalanda** : Town in Bihar, famous for the Nalanda University in Hindu times.
- (d) **Mohenjo Daro** : Site of excavations in Sindh, Pakistan. Notable monuments of Ancient Indian Civilization.
- (e) **Flushing Meadows** : Suburb of New York U. S. A. Meeting place of the U. N. O.
- (f) **Reykjavik** : The capital and largest city of Iceland.
- (g) **Dum Dum** : Town and cantonment of West Bengal. Famous because it gives its name to a bullet first made here.
- (h) **Gettysburg** : Town of Pennsylvania, U. S. A. Near here in 1864, one of the decisive battles of the American Civil War was fought.
- (i) **Noakali** : Town in East Bengal. Scene of communal disturbances in 1946-47 and Mahatma Gandhi's march in this area on foot to bring about Hindu-Muslim conciliation.
- (j) **Falkland Islands** : British colony in South Atlantic-Great whaling centre.
- (k) **Wake islands** : Islands in Pacific Ocean between the Philippines and Hawaii : calling place on trans-Pacific air route. Here President Truman met Gen. Mac-Arthur to confer about the U. N. strategy in the Korean War and the question of the 38th Parallel.

Q. 75. Explain briefly the geographical position and importance of :—

- (a) **Alexandria.**
- (b) **Pearl Harbour.**
- (c) **38th parallel.**
- (d) **The Dardenelles.**
- (e) **Panama.**

Ans. Alexandria : It is the chief port of Egypt. Its importance lies in the fact that it commands entrance to the Suez Canal and for this reason it has been the main British naval base in the Mediterranean. The Egyptian cotton trade passes through this port.

Pearl Harbour : It is a U.S. naval base at Oahu, chief of the Hawaiian Islands. Lying in Mid Pacific, its command enables the holding power to attack easily U. S. A. on the one hand,

and the mainland of Asia on the other. It was the scene of a surprise Japanese attack on Dec. 7, 1941.

38th Parallel : The famous parallel of latitude dividing North and South Korea. It came into world news when the Korean war started. Its crossing by U. N. forces compelled communist China to intervene in this war.

Dardanelles : Strait between Europe and Turkey in Asia. It separates Europe from Asia and for that reason played a great part in history. It has been fortified by Turkey and commands entrance to the sea of Marmora.

Panama : Narrow strip of land which joins Central to South America. It is crossed by the Panama Canal. It commands entrance to the Pacific and Atlantic Oceans.

Q. 76. Arrange the following languages in descending order according to the number of people in the Indian Union (including the States) who speak them.

Tamil, Telugu, Oriya, Punjabi, Marathi, Gujarati, Bihari, Malayalam, Munda, Bengali, Rajasthani and Hindi.

Ans. Hindi (140,000,000), Bengali (63,000,000), Bihari (28,000,000), Telugu (27,000,000), Tamil (23,850,000), Marathi (23,000,000), Punjabi (18,800,000), Rajasthani (15,000,000), Gujarati (13,000,000), Malayalam (10,000,000), Oriya (9,000,000), Munda (5,000,000).

Q. 77. Which of the following could India advantageously export to or import from ?

(1) Pakistan (2) Indonesia (3) Hungary (4) The U.S.S.R.

Wheat, cotton, jute, tea, tobacco, rubber, diesel engines, aniline dyes, pharmaceuticals, cotton piece goods, cement, jute goods, spices, tin, teak wood, raw hides and skins.

Ans. (1) India can export to Pakistan :

Tea, tobacco, rubber, cotton piece goods, cement, jute goods.

Pakistan can export to India :

Wheat, cotton, raw hides and skins

(2) India can export to Indonesia :

Tea, tobacco, cotton piece goods, cement, jute goods.

Indonesia can export to India :

Spices, tin, teak wood, raw hides and skins.

(3) India can export to Hungary :

Cotton piece goods, tea, tobacco, hides and skins and rubber.

Hungary can export to India :

Diesel engines, aniline dyes, pharmaceuticals.

(4) India can export to the U.S.S.R. :

Jute and jute goods, tobacco, tea, rubber, cotton piece goods etc.

The U.S.S.R. could supply to India :

Wheat, cement, diesel engines etc.

Q. 78. Where do the following trees grow, and what are their uses ?

(a) **Belladonna.**

(b) **Cinchona.**

(c) **Coconut Palm.**

(d) **Poppy.**

(e) **Walnut.**

(f) **Bamboo.**

Ans. Belladonna. It grows wild in Europe and Asia. It is also cultivated. Hyocine, belladonnine and atropine are prepared from it ; these drugs being used as anodynes.

Chinchona. A tree from whose bark extracts are obtained, such as quinine. Native of the eastern slopes of the Andes 3000 to 10,000 ft. above sea level. Now grown also in Java, India and Ceylon. Java produces 90 per cent of the world's production.

Cocoanut Palm. All tropical countries, but thrives best near the sea. Its fruit is eaten. Its oil is used for the hair and for making face cream. Its fibre is used for stuffing, and mattresses. Its wood is also valuable.

Poppy. It is found in Asia, Europe, America, South Africa and Australia.

It yields the well known opium.

Walnut. Asia minor, Kashmir. Its wood is used for furniture and for gun stocks ; an oil extracted from the nuts is used by painters as a drier.

Bamboo. It grows in the tropics. It is used for building purposes, and as wood pulp for paper. Its young shoots are edible.

Q. 79. In what countries are the following animals found ?

(a) **The Kangaroo.**

(b) **The Giraffe.**

(c) **The Python.**

(d) **The Rattlesnake.**

(e) **The Beaver.**

(f) **The Camel,**

Ans. *The Kangaroo* : Australia.

The Giraffe : Border of the Sahara.

The Python : Burma.

The Rattlesnake : Central America.

The Beaver : In Europe and America.

The Camel. The Sahara, Arabia, India and West Pakistan.

Q. 80. What do you know of the following ? :—

(a) **Westminster Abbey.**

(b) **The Eiffel Tower.**

(c) **The White House.**

(d) **Shantiniketan.**

(e) **Downing Street.**

(f) **Big Ben.**

Ans. Westminster Abbey. A monastery dedicated to St. Peter on the island of Thorney in the estuary of the Thames. Most of it was built by Henry III from 1245-1270. It has been the scene of coronation of all English kings since Harold. Great men and kings of England are buried here.

Eiffel tower. Colossal iron structure, wireless station Paris.

The White House. Official residence of U. S. A. President in Washington.

Shantiniketan. University in Bengal (Bolpur) founded by Dr. Rabindra Nath Tagore.

Downing Street. (No. 10.) Official residence of the Prime Minister ; of the Chancellor of Exchequer (No. 11), and of the Chief Whip (No. 12).

Big Ben. Clock in Westminster on the tower of the Houses of Parliament.

Q. 81. State where the following islands are situated :—

Leeward islands, Andaman islands, Luzon, Mauritius, Celebes, Hispaniola, Faroes, New Guinea, Hokkaido, Tierra Del Fuego and Baffin.

Ans. Leeward islands are in the Caribbean Sea north of the Windward islands, being a group of islands in the West Indies ; Andamans in the Bay of Bengal ; Luzon, one of the Philippine Islands ; Mauritius in the Indian Ocean, east of Madagascar ; Celebes in the south west Pacific ; Hispaniola, in the Caribbean Sea ; Faroe islands in the Atlantic, about 200 miles north west of Scotland ; New Guinea in the South Pacific ; Hokkaido, in the Sea of Japan in the Pacific ; Tierra Del Fuego,

near the southern tip of South America ; Baffin in the Arctic Ocean.

Q. 82. Which are the longer in the following pairs of rivers ? :—

(a) Congo or Nile (b) Murray or St. Lawrence (c) The Indus or the Ganga (d) Brahmaputra or the Irrawaddy (e) The Ural or Ob (f) The Amazon or Mississippi-Missouri (g) The Yangtsekiang or Amur Darya (h) Dnieper or Don.

Q. 83. State (a) The source (b) The approximate length (c) The sea or ocean into which the following rivers fall :—

(i) Congo (ii) Volga (iii) Euphrates (iv) Zambezi (v) Colorado (vi) Orange (vii) Tigris (viii) Hwang Ho (ix) Ob.

Ans. (a) The Nile (b) Murray (c) Indus (d) Brahmaputra (e) Ob (f) Mississippi-Missouri (g) Yangtze Kiang (h) Dnieper.

Ans.	Name	The Source	Length in Sea or Ocean miles
1.	Congo	Between Lakes Nyasa and Tanganyika	2900 Atlantic Ocean
2.	Volga	Valdai Plateau (U. S. S. R.)	2300 Caspian Sea
3.	Euphrates	Domlu Dag Mount in Turkey	1700 Persian Gulf
4.	Zambezi	Northern Rhodesia (Africa)	1600 Indian Ocean
5.	Colorado	Middle Park Northern Colorado	Gulf of California
6.	Orange	Basutoland (Africa)	1300 Atlantic Ocean
7.	Tigris	Tarrus Mountain (Turkey)	1150 Persian Gulf
8.	Hwang Ho	West China	2700 Gulf of Chihli
9.	Ob	Atlas Mount (U. S. S. R.)	3200 Gulf of Ob

Q. 84. What are the approximate heights of the following Himalayan peaks ? :—

Jamnotri, Kidarnath, Gangotri, Badrinath, Nanda Devi, Dhaulgiri and Gauri Shankar.

Ans. Jamnotri 20720 ; Kidarnath 22700 ; Gangotri 21700 ; Badrinath 23190 ; Nanda Devi 25645 ; Dhaulgiri 26793 ; Gauri Shankar 23440

Q. 85. How many different motions has the earth ? What are they ?

Ans. It has three—its motion on its axis which it completes in a day (23 hr. 56 mins.) ; its motion round the sun at $18\frac{1}{2}$ miles a second, which it completes in a year (365 days, 5 hrs. 48 mins. 46 sec.) and its motion with the whole solar system towards a point not far from the star Vega at a speed of about $12\frac{1}{2}$ miles a second.

Q. 86. What articles are being manufactured in the following towns ?

Coventry, Banaras, Darjeeling, Dhariwal, Dundee, Havana, Jamshedpur, Katni, Ludhiana, Moradabad, Nottingham, Sheffield, Jullundur, Titagarh.

Ans. Coventry manufactures motor cars, cycles, ribbons and watches ; Banaras sarees, brocades and brassware ; Darjeeling : tea and quinine ; Dhariwal woollen textiles ; Dundee jute ; linoleum, preserves, shipbuilding & fisheries ; Havana : cigars, tobacco, sugar, rum, coffee, woollens, straw hats ; Jamshedpur iron and steel ; Katni : cement ; Ludhiana : hosiery ; Moradabad : utensils and calico printing ; Nottingham : centre of English lace industry, also hosiery, woollens, and brewing ; Sheffield : cutlery, steel, iron, brass manufacturing, machinery, instruments, electroplating ; Jullundur : sports industry ; Titagarh : paper and jute.

Q. 87. Name the approximate population at the present day of the Indian Union, Australia, Delhi, Bombay, Kashmir-Jammu State, U.S.S.R, China and the U.S.A.

Ans. Population of India 361·82 million, Saurashtra 41·36 lakhs, Australia 8185600 : Delhi 1744072 ; Bombay : 48265221 (1951 census) ; Jammu and Kashmir State : 40,261,1 (1951 census) U. S. S. R. 20,00,00,000, China : about 50,00,000 and U. S. A. 18,00,00,000.

Q. 88. What were and are (a) The Mannerheim Line (b) The Wailing Wall (c) The Maginot Line (d) The Siegfried Line (e) The West Wall (f) The Hinderburg Line (h) The Curzon Line (g) The Durrand Line (i) The McMohan Line.

Ans. (a) **Mannerheim Line.** Line of defence in Finland constructed at the suggestion of Marshal Mannerheim as a line of defence against the U. S. S. R.

(b) **Wailing Wall.** Wall in Jerusalem on the site of, and believed to have been a part of, Solomon's Temple. It is one of the most sacred of spots to the Jews, who for centuries have gathered here to bewail the decline from greatness of their nation.

(c) **Maginot Line.** French system of fortifications along the France. German border built in 1927 under the direction of Andre Maginot, the then War Minister. It was outflanked by the Germans in 1940.

(d) **The Siegfried Line** was Germany's strongly fortified western frontier line, mostly constructed of steel and concrete, and consisting of underground communication chambers and dug-outs.

(e) **The West Wall** was the German name for their defences, in the 2nd World War, against invasion from the sea all along the western coast of Europe, or for defences guarding the western frontiers of Germany.

(f) **The Hindenburg Line** was a highly fortified line constructed by the Germans in France in 1916, running from Arras to Laon. It was to this line that the German army retreated after the battle of the Somme. It was captured by the British in the autumn of 1917.

(g) **The Curzon Line.** A provisional eastern frontier for Poland, drawn at the instance of Marquess Curzon, British Foreign Minister, by the Supreme Council of the Allies in Paris in 1919, and excluding from the Polish state, territories inhabited mainly by non-Polish populations.

(h) **Durrand Line.** The frontier between Afghanistan and India, now in Pakistan, as laid down in 1893.

(i) **McMahon Line,** is the border line dividing Assam from Tibet.

Q 89. To whom do the following belong and what are their status ?

Bhamas, Iceland, Canary Islands, Borneo, British Columbia, Cameroons, Cyprus, Greenland, Liberia, Sandwich Islands, Gaum, Ivory coast Africa, Madagascar, Fiji Islands, Sudan, Mauritius, Mozambique ; New Guinea, Northern Ireland, Northern Rhodesia, Reunion Island, Saint Helena, Senegal, the Sikkim State, Sumatra, Nyasaland and Swaziland in Africa.

Ans. Bhamas is a British Crown Colony ; Iceland is a republic ; Canary islands belong to Spain and for administrative purposes are considered as part of Spain ; Borneo is an island, being one of the Republic of Indonesia ; British Columbia is a part of Canada ; Cameroons is a French Trust in Africa ; Cyprus is a British Colony ; Greenland is a Danish Colony ; Liberia is a republic in Africa ; Sandwich Islands, now called the Hawaiian Islands are a territory of the U. S. A. ; Fuam belongs to the U. S. A. ; The Ivory Coast in Africa is a French Colony ; Madagascar is a French Colony ; Fiji Islands are a British Colony ; Sudan is a republic ; Mauritius is a

British Colony ; Mozambique in Africa is a Portuguese Colony ; The New Guinea island is an Australian Trust ; Northern Ireland is a part of the United Kingdom with home rule ; Northern Rhodesia is a British Crown Colony ; Reunion Island in the Indian Ocean is a French Colony ; St. Helena is a British Crown Colony ; Senegal is a French Colony ; The Sikkim State is centrally administered by India ; Sumatra is a part of the Indonesian Republic ; Nyasaland is a British Protectorate ; Swaziland in Africa is a British Protectorate.

Q. 90. Of what countries are following the capitals ?

Gangtok, Djibouti, Palembang, Damascus, Bucharest, Jamestown, Lima, Belfast, Asmara, Jerusalem, Quilo, Prague, Santiago, Sofia, Kuala Lumpur, Caracas, Montevideo, Bangkok, Port Blair, Leopoldville, and La Paz.

Ans. Gangtok is capital of the Sikkim State ; Djibouti of French Somaliland ; Palembang is a port of Sumatra ; Damascus is capital of Syria ; Bucharest of Rumania ; James Town of St. Helena ; Lima of Peru ; Belfast of Northern Ireland ; Asmara of Eritrea ; Jerusalem of Israel ; Quilo of Ecuador ; Prague of Czechoslovakia ; Santiago of Chile ; Sofia of Bulgaria ; Kuala Lumpur of Malaya ; Caracas of Venezuela ; Montevideo of Uruguay ; Bangkok of Thailand ; Port Blair of the Andaman islands ; Leopoldville of Belgian Congo and La Paz of Bolivia.

Q. 91. On what rivers do the capitals of the following countries stand ?

India, Argentina, France, Great Britain, U.S.A., Canada, Italy, Eire, Iraq, Burma, Spain and Portugal.

Ans. India—Delhi on the Jamuna ; Argentina—Buenos Aires on the Rio de la Plata ; France on the Seine ; Great Britain—London on the Thames ; U. S. A.—Washington on the Potomac ; Canada—Ottawa on the Ottawa ; Italy—Rome on the Tiber ; Burma—Rangoon on the Irrawaddy ; Iraq—Bagdad on the Tigris ; Eire—Dublin on the Liffey , Spain—Madrid on the Manzanares ; Portugal—Lisbon on the Tagus.

Q. 92. Mention six of the chief railways in India before their regrouping and state why they were so very important. What are the Zones into which the Indian railways have been grouped. How have the railways been grouped. What advantages will accrue to the country by these regroupings ?

Ans. The following were the six railways before grouping into zones took place.

(1) The Bengal Nagpur Railway. This was one of the most important railway line in the country as it traversed areas working

coal, manganese and iron mines. It linked these areas with the ports of Calcutta and Vishakhapatnam.

(2) Bombay, Baroda and Central India Railway (B. B. and C. I.) was important because it linked the cotton growing areas of Western and Central India with Bombay, besides passing through the belt working iron ore, coal and manganese.

(3) The East Indian Railway (E.I.R.) ran through the rich coal-fields of Bengal and Bihar and connected some of the most fertile regions of the Uttar Pradesh and Bihar with the port of Calcutta.

(4) The Great Indian Peninsula Railway (G. I. P.) besides connecting the Deccan and Central India with the important port of Bombay, served an area which is rich in cotton and oil seeds.

(5) The Madras and Southern Marhatta Railway (M. and S. M. Rly.), connected some of the rich cotton growing areas of the south with Mourmugao on the west coast and Waltair on the east coast.

(6) The Oudh and Tirhut Railway (O. T. Rly.) traversed some of the most important sugar-cane, grain and timber districts of India.

The following are the seven zones into which Indian railways have been grouped —

(1) The Northern (2) Western (3) Central (4) Southern (5) Eastern and (6) North Eastern zone (7) South Eastern zone.

The grouping is as follows :—

The Northern Railway comprises the East Punjab Railway, Jodhpur Railway, Bikaner State Railway and western portion of the East Indian Railway.

The Western Zone Railway includes the broad gauge section of the B. B. and C. I. Railway, the Saurashtra Railway, the Rajasthan Railway and the Jaipur State Railway.

The Central Zone Railway is composed of the G. I. P. Railway, the whole of the Nizam's State Railway, the Dholpur State Railway and the Scindia State Railway.

The Southern Zone Railway is composed of M. and S. M. Railway, the South Indian Railway, and Mysore State Railway.

The Eastern Zone Railway consists of portion of the G. I. P. and M. and S. M. and B. N. Railway excluding the coal-field area and the Howrah-Kharagpur section. It has now been bifurcated into Eastern and South Eastern Railway.

The North Eastern Zone Railway includes the East Indian Railway east of Lucknow, Kanpur, the coal-field area and the Howrah-Kharagpur section of the Bengal Nagpur Railway, the

O. T. Railway east of Chapra, the Assam Railway including the Assam rail link and the Darjeeling-Himalaya railway.

This regrouping provides better facilities to commerce and industry so far as their dealings with the railways are concerned and makes the working of the railways more efficient. Also the disparities in the standards of the smaller individual railways and their methods of working have disappeared. The disappearance of the smaller lines removes the weak links of the transport system of the country.

Again, the reorganization of administration, the tightening up of control, the application of the increased resources of the enlarged system to the maximum advantage, the elimination of duplication and waste has helped to reduce the overall cost of transportation both to the nation and to the individual and is thus of great advantage to both.

Q. 93. (a) What is an inhabitant of each of the following countries called?—

(i) Malta (ii) Denmark (iii) Finland (iv) Spain (v) Norway (vi) The Netherlands (Holland) (vii) Sweden.

(b) Of which countries are the following the national emblems?

The Rose, The Red Rose, Thistle, Golden Wattle, Azalea, Edelweiss, Lily of the Valley, The Tulip, The Cherry Blossom, The Plum Blossom, The Lotus, The Corn Flower, Forget-me-not.

Ans. (a) The inhabitants of Malta are called Maltese; of Denmark, the Danes; of Finland the Finnish; of Spain, the Spaniards; of Norway, the Norwegians; of the Netherlands or Holland, the Dutch; of Sweden, the Swedes.

(b) England and Rumania are associated with the Rose; Scotland with Thistle; Persia with the Red Rose; Australia with Golden Wattle; Belgium, Azalea; Switzerland, the Edelweiss; Yugoslavia, the Lily of the Valley; France, the Lily; Hungary, the Tulip; Japan, the Cherry Blossom; China, the Plum Blossom; India and Egypt, the Lotus; Germany and Poland, the Cornflower; Denmark, the Forget-me-not.

Q. 94. In which universities in India are or have recently been following the Vice-Chancellors?

Acharya Jugal Kishore, Acharya Narendra Dev, Dr. Zakir Hussain, Shri M. C. Mahajan, Sarda Mehta, Dewan Anand Kumar, Mrs. Hansa Mehta and Hon. Justice Natwerlal Harilal Bhagwati.

Ans. Acharya Jugal Kishore was Vice-Chancellor of Lucknow University; Acharya Narendra Dev of Banaras University; Dr. Zakir Hussain of Aligarh Muslim University; Shri M. C. Mahajan of Agra University; Sarda Mehta of N. D. Thakersay

Women University ; Dewan Anand Kumar of Punjab University ; Mrs. Hansa Mehta of Baroda University ; Justice Natwerlal Hirallal Bhagwati of Bombay University.

Q. 95. Complete the names of the districts of the states, a few of which are given for each.

(a) Lakhimpur, Sibsagar, Nowgong.....(b)
Hoshiarpur, Hissar, Gurgaon (c) Kistna, Nellore,
Tanjore.....(d) Balasore, Ganjam, Sambalpur.....and
(e) Bankura, Malda, Nadia.....

Ans. (a) Lakhimpur, Sibsagar, Cachar, Darrang, Goalpara, Kamrup, Khasi and Jaintia Hills, Garo Hills, Mizo Hills, Mikir and North Cachar Hills,

(In Assam State).

(b) Hoshiarpur, Hissar, Gurgaon, Ambala, Amritsar, Ferozpur, Gurdaspur, Jullundur, Kangra, Karnal, Lahore (Part only), Ludhiana, Rohtak.

(In East Punjab)

(c) Kistna, Nellore, Tanjore, Anantpur, Bellary, Chingleput, Cuddapah, Coimbatore, Godaveri East, Godaveri West, Guntur, Kurnool, Chittoor, Malabar, Madura, Nilgiris, Madras, North Arcot, Ramnad, Salem, South Arcot, Trichinopoly, Tinnevely, South Kanara, Vizagapatam

(In Andhra State).

(d) Balasore, Bolangir, Cuttack, Dhenkanal, Ganjam, Kalabandi, Keonjhar, Koraput, Mayurbhanj, Phulbari, Sambalpur, Sundergarh and Puri,

(In Orissa).

(e) Bankura, Malda, Nadia, Birbhum, Burdwan, Calcutta, Darjeeling, (West) Dinajpur, Hoogly, Howrah, Jalpaiguri, 24 Parganas, Darjeeling, Murshidabad, Purnia, (In West Bengal)

Q. 96. With what great monument of historical or archaeological interest are the following places connected ?

Ajmer, Bijapur, Hampi, Konarak, Sanchi, Sikandra, Sirhind and Madura.

Ans. Ajmer with Dargah Khwaja Sahib, the tomb of the Muslim Saint, Muin-ud-din Chisti ; Bijapur with the Mausoleum of Sultan Mohd. Adil Shah, Popularly known as the Gol Gumbaz ; Hampi with the ruins of the Vijayanagar State ; Konarak with the Black Pagoda dedicated to the Sun god ; Sanchi with the Buddhist stupa ; Sikandra with the tomb of Akbar ; Sirhind with the Mausoleum of Hazrat Mujaddid Alf-i-Sani ; Madura with Shree Meenakshi Temple.

Q. 97. Where in India would you find the following ?

Gateway of India, Gol Gumbaz, the Kurla Caves, Khajuraho Temple, Mount Girnar Temple, Tower of Silence, Tower of Victory, Pushkar Raj Lake, the Rashtrapati Bhawan, Fort William and the Diamond Harbour.

Ans. Gateway of India at Bombay ; Gol Gumbaz in Bijapur ; Kurla Caves at Lonavala in the Bombay State ; Khajuraho Temple in Chattarpur State ; Mount Girnar east of Junagarh in Saurashtra ; Tower of Silence in Bombay ; Tower of Victory at Chitorgarh ; Pushkarraj Lake seven miles from Ajmer ; Rashtrapati Bhawan in New Delhi ; Fort William in Calcutta ; Diamond Harbour 37 miles from Calcutta.

Q. 98. Give the situation and importance of the following places :—

Badrinath, Jerusalem, Uri, Gibraltar, Ahmedabad, Singapore, Baghdad, Malta, Cypress, Antwerp, Panama.

Ans. **Badrinath** near Gangotri Glacier in the Himalayas. Contains the pilgrim shrine of Vishnu, sacred to the Hindus.

Jerusalem about 33 miles S. E. of Jaffa in Palestine, between the Dead Sea and the Mediterranean, the "Holly City" or "City of Peace" of the Jews and sacred city of Christians and Muslims.

Uri. Village in Kashmir on the Kohala Srinagar bus route, being on the border line where stand facing each other the Indian and Pakistani forces. Is of strategic importance.

Gibraltar is a promontory of rock in the south of Spain. It has an enormous strategic value as it commands entrance to the Mediterranean from Atlantic. It is a naval base of the British and is also an important coaling station.

Ahmedabad is the chief town of Gujerat in Bombay State on the river Sabarmati. It is one of the industrial centres of Western India, specially of the textile industry.

Singapore is a town and island in the Straits Settlements, Malaya Archipelago. It is a great military and naval station and is of considerable strategic importance as it guards the ocean route to the Far East, but its weakness was exposed when it surrendered to the Japanese attacking it from the mainland of Malaya in 1942. It is also of great importance as it is the outlet of Malaya's tin, fruits and rubber.

Baghdad is situated on the Tigris in Iraq, 500 miles up its mouth. The city of "Arabian Nights" fame, it is a great centre of communications.

Malta is an island about 80 mile south of Sicily. Headquarters of the British Mediterranean fleet, it is the most important naval station in that sea.

Cypress is a mountainous island of the Levant in the Mediterranean sea. It is of considerable strategic importance to Britain of which it is a crown colony, as it enables Britain to command the sea in that area and to render help to Greece and

Turkey whenever there will be any communist menace to them, as also serve as a supply base to its forces stationed in the Suez Canal Zone.

Antwerp is a fortified trading city in Belgium on the river Scheldt, 50 miles from the sea. It is the chief commercial centre of Belgium and one of the principal ports of N.W. Europe. It was this city which Napoleon regarded as "a pistol pointed at the heart of England."

Panama is the southern most republic of Central America. It is of strategic importance as it has the Panama Canal which links the Atlantic and Pacific oceans.

Q. 99. Name the sources (animal, vegetable or mineral) of any eight of the following industrial commodities :—

- (a) Vegetable ghee.
- (b) Quinine.
- (c) Solder.
- (d) Cement.
- (e) Paper.
- (f) Bleaching powder.
- (g) Porcelain.
- (h) Glue.
- (i) Kerosine oil.

Ans. (a) Vegetable ghee from groundnuts, oil seeds and cotton seeds.

(b) Quinine from the bark of the cinchona tree.

(c) Soft solder made of tin, lead and bismuth. Hard solder is made of copper, lead and (for precious metals) silver.

(d) Cement from lime and clay.

(e) Paper from linen and rags, straws, esparto-grass, wood pulp, bamboo etc.

(f) Bleaching powder from slaked lime and chlorine.

(g) Porcelain from clay.

(h) Glue from bones, animal skins, hoofs, fish skins.

(i) Kerosine oil from petroleum and shale.

Q. 100. Answer the following :—

(a) What is the ordinary composition of sea water? What is that of the Dead Sea?

(b) In what way does a meridian help determine time?

(c) What is International Date Line? What happens to the calendar of a traveller when he crosses it?

(d) Of what continent is Central America a part ? Name all the countries which make Central America.

(e) Who discovered the (1) North Pole (2) The South Pole (3) The Pacific Ocean (4) Cape Horn (5) Antarctica ?

(f) Where are the world's largest tin fields ?

(g) Where are Abadan, Pan Mun Jaon ? Why have they come into world news ?

(h) What is a cash crop ? Give a couple of examples.

(i) Between what latitudes lie the Polar Zones and the Temperate Zones ?

(j) What and where is the Hague ?

(k) Which states will derive benefits on the completion of (i) The Damodar Valley Project (ii) The Kosi Project (iii) The Bhakra Nangal Project and (iv) The Hirakud Project. What amounts are expected to be spent on these projects ?

(l) Where are the following and with what are they associated ?

The Tilaiya Dam ; Damodar Valley ; The Kodarma Mines ; Hazaribagh District ; The Maithon.

Ans. (a) The sea water contains common salts and other chemicals which average about $3\frac{1}{2}$ per cent by weight of the water in the sea. Major part (nearly three quarter) is the common salt. Other salts present are the magnesium and potassium chlorides, besides magnesium, calcium and potassium sulphates ; also calcium sulphates as also calcium carbonate.

The salt contents of the Dead Sea in Palestine is over 25 per cent.

(b) Meridian is an imaginary great circle passing through the poles at right angle to the equator. The Meridian of Greenwich is the point from which longitudes are taken.

Now we know that the earth turns through 360° in 24 hours or the sun reaches 15° W each hour. Therefore if we are, say 180° longitude east of Greenwich it is 12 O'clock in the morning, if it is 12 O' clock in the night at Greenwich. If we are at 90° east longitude of Greenwich it is 6 O' clock in the morning. If it is 1 p. m. at Greenwich all places on the earth on the 0° meridian have 1 p. m. time.

(c) The International Date Line is a modification of the 180° meridian marking the difference of time between East and West. The date is put forward a day when crossing the Line going West and back a day when going East.

(d) Central America is part of North America south of Mexico. The countries which make Central America are : Costa

Rica, Honduras, Guatemala, Salvador, British Honduras, Nicaragua and Panama.

(e) The North Pole was discovered by Peary, the American explorer; the South Pole by Amundsen, the Norwegian explorer, the Pacific ocean by Balboa, the Spanish explorer; Cape Horn by Schouten, the Dutch navigator; Antarctica by Bellingshausen, Russian navigator.

(f) World's tin fields are in Malaya, Australia and Bolivia.

(g) Abadan is in Iran and has come into the world news on account of the dispute about its great oil refinery, which Iranian Government wanted to nationalize, while the British did not quite agree to it, as it meant the liquidation of the famous Anglo-Iranian oil company which was a source of immense income to them.

Pan Mun Jon is the place in Korea where parleys between the U. N. and Communist representatives for settlement of a cease-fire line took place.

(h) A crop which is sown only with the purpose of making money is a cash crop like that of cotton, tobacco, tea or sugar-cane.

(i) The polar zones are the belts of climate on the surface of the earth between the poles and $23\frac{1}{2}^{\circ}$ latitudes from the poles.

The Temperate Zones are zones, subject to moderate temperature and are between $23\frac{1}{2}^{\circ}$ from the equator and $23\frac{1}{2}^{\circ}$ below the Frigid Zones. That in the north is called the North Temperate Zone and that in the south, the South Temperate Zone.

(j) The Hague is the capital of the Netherlands, about 2 miles from the North Sea. It is the seat of the Hague Tribunal and of the International Court of Justice.

(k) (i) Bengal and Bihar will benefit from the Damodar Valley Project. It is expected to cost about 78 crores of rupees

(ii) The Kosi Project will benefit Bihar and Nepal. It will cost about Rs. 177 crores.

(iii) The Bakhra Nangal Project will benefit the East Punjab and Rajasthan. It will cost about Rs. 170 crores.

(iv) The Hirakud Project will benefit mainly Orissa and Bihar and the power will be specially used by the Tata Iron and Steel Works at Jamshedpur. It will cost about 100 crores of rupees.

(l) (i) Tilaiya is a tract of land in the Hazaribagh district of Bihar, site of the dam, called the Tilaiya dam into which will flow the Barakar, a branch of the Damodar river. It is one of the dams in the Damodar River Valley Project.

- (ii) *Damodar Valley*. A valley sprawling across the frontiers of Bihar and West Bengal, through which flows the river Damodar and its tributaries. It is this valley in which the great multipurpose projects of dams and power stations are being vigorously constructed, with the object of flood control, generation of electricity for industrial and other purposes and for irrigating land.
- (iii) The Kodarma mines in Bihar, are the biggest mica mines in the world.
- (iv) *Hazaribagh district* is one of the districts of Bihar rich in coal and mica mines.
- (v) *Maithon* is the dam site on the river Barakar above its confluence with the Damodar, about 15 miles north east of Asansol. It is one of the dams in the Damodar River Valley project.

Q. 101. (a) Name five of the principal agricultural products of India and state where they are chiefly grown. What is the average area under each crop ?

(b) Name five of the principal industries of India and state where they are located.

(c) Name some of the cottage industries of India that have survived foreign competition.

(d) What is the difference between small scale industries and cottage industries ? Give examples of some of the small scale industries in India and state where they are at present located.

Ans. (a) Five of the principal products of India are rice, wheat, sugar cane, tea and cotton.

Rice is grown chiefly in West Bengal, Assam, Orissa, Bombay and Madras ; wheat in East Punjab, U. P., Bombay and Madhya Pradesh ; sugar-cane chiefly in U. P., Bihar, Bombay, Madras and East Punjab ; tea is chiefly grown in Assam, U. P. (Dehra Dun), East Punjab (Kangra valley) and Kerala ; cotton is mostly grown in Bombay (Gujarat), Madhya Pradesh, Madras, Bihar, and Hyderabad.

(b) Five of India's most important industries are (1) The Cotton Textile industry located at Bombay, Ahmedabad, Sholapur, Nagpur, Kanpur, Madras, Coimbatore, Delhi and Madura in the Madras State (2) The Iron and Steel industry located at Jamshedpur in Bihar (Tata Iron and Steel Works), Bengal Iron Co. Ltd., Hirapur, Indian Iron and Steel Co. Ltd., at Burnpur near Asansol, United Steel Corporation at Manoharpur and Mysore Iron and Steel Works at Bhadarvati, (3) Jute industry is located at Calcutta (4) Sugar industry is mostly in U. P. and Bihar (5) Paper industry is mostly located in Calcutta. Other centres are Lucknow,

Bombay, Saharanpur, Panaher in Kerala, Sirpur in Andhra Bhadravati in Mysore, Dalmianagar in Bihar, Sambalpur in Orissa and Jagadhri in East Punjab.

(c) The cottage industries that have survived foreign competition are : Cotton Handloom industry, woollen industry (*Shawls, nambdas, pattus, lois* etc.), silk rearing and weaving industry, Other minor industries are : carpet weaving, niwar making, utensil making, soap making, wood work etc. etc.

(d) Small scale industries may be distinguished from Cottage industries in that the former produce goods with partially or wholly mechanised equipment employing outside labour, while the latter involve operations mostly by hands and are carried on primarily with the help of the members of the family.

Examples of the small scale industries and their location are given below :—

(1) Small engineering industries mostly in and around Calcutta, for example those for the manufacture of textile accessories, such as bobbins and pickers, manufacture of cycle components and accessories in East Punjab and West Bengal.

(2) Industries producing buttons, pencils, fountain pen ink, slate and slate pencils, preserved fruits, sago etc.

(3) Among the older industries that have survived competition and have been able to establish themselves are the silver thread and wire, called the jari in Surat ; bangle industry in Firozabad, U.P. Also, the art silk industry using power looms is to be found in many parts of the country.

Q. 102. (a) What are the most important minerals found in India ? Where are they located ?

(b) What are non-ferrous metals ? Does India produce them ?

(c) What is the total area under both state and private forests in the Indian Union and what is its percentage to the total land area of the country ? Name some of the major forest products of India.

(d) Which part of the Rajputana desert can you describe thus : Over a huge area of 16000 miles and beyond, one sees almost nothing but a vast expanse of wind blown sand unredeemed by any human habitation for miles on end, and where a sight of a few animals and patches of green is a veritable oasis in the heart of the desert."

Ans. (a) Most important minerals of India are : Iron Ores, Coal, Manganese, Mica, Bauxite, Beryl, Abrasives, Corundum, Gypsum, Magnesite, Monazite, salt peter, Ilminite, Cobalt, Steatite, Titanium, Tungsten, Thorium and Petroleum and to some

extent Gold. The location of the most important of these is as follows :—

Deposits of *Iron Ores* occur in Bihar, Orissa, Central India, Madras, Mysore and Bombay ; *Coal* is found chiefly in Bihar, Bengal and Orissa. There are also some deposits in central India, Assam and Hyderabad ; *Petroleum* is found at Digboi, Bappapung and Hansapung also in Cambay ; *Manganese* occurs in M.P., Bombay, Mysore, Madras, and Orissa ; *Mica* in Bihar, Rajasthan and Madras ; *Chromite* in Bombay, Madras and Mysore ; *Gold* in the gold fields of Kolar in Mysore ; *Gypsum* in the Bikaner and Jodhpur states ; in Madras and in Trichnopoly area ; *Ilmenite* in Kerala coastal sands ; *Monazite* in Mysore and Singbhum in Bihar and *Saltpeter* in U.P. and Bihar.

(b) Metals other than iron and its alloys are called non-ferrous ; e.g., copper, lead, zinc etc. India's reserves of non-ferrous metals are insignificant.

(c) According to the latest report of the Planning Commission the total area under both State and private forests in the Indian Union has been estimated at 207,770 sq. miles or 130 million acres, representing 19.2 per cent of the total land area of the country. Some of the major forest products are : Essential oils, dyeing and tanning substances, gums and resins, lac, bees wax, honey, rubber and of course timber and fuel woods. Silk may also be considered a forest product, since the silk worm thrives on the mulberry tree.

(d) The desert borderline of Rajputana, specially the state of Jaisalmer.

Q. 103 What and where are the following :—

Azerbaijan, Belorussia, Bikini, Eritrea, Izmir, Heligoland, Memel, Manchukuo, The Kuriles, Trieste and Amoy.

Ans. *Azerbaijan* is a Soviet Republic in Transcaucasus, west of the Caspian Sea. Also, a province of Armenian Iran south of the river Aras bears this name ; *Belorussia*, also spelt as Byelorussia, known also as White Russia, is a Soviet Socialist Republic in the west of Russia, bordering on Poland ; *Bikini* is an atoll in the Pacific north west of the Marshall Island, where in 1946 atom bomb tests were carried out by the U. S. army and navy ; *Eritrea* is a former Italian colony in East Africa bordering the Red Sea on the north east and with Ethiopia on the south west ; *Izmir* is the official name of Smyrna which is a port of Turkey on the Aegean Sea ; *Heligoland* is an islet in the North Sea about 35 miles from the mouths of the Elbe and the Weser ; *Memel* is a port on the Baltic that belonged to Germany. After the Second World War it has been incorporated in Lithuanian S. S.R. ; *Manchukuo* is the name of the puppet state set up by the Japanese in 1932 after their conquest of Manchuria ; *The Kuriles* are a chain of 47 small islands stretching

from the north east of Hokkaido island of Japan to the south of Kamchatka. After the 2nd World War the Russians took it from the Japanese; Trieste is a harbour on the Adriatic sea and belonged formerly to Italy. It is now the centre of a free territory formed in 1947; Amoy is a port of China on a small island in the strait of Fukien. Has one of the finest harbours in the world, and was formerly a treaty port.

Q. 104 (a) Name at least three of the commonest trees in the following regions in India :—

- (i) Mountain tracts.
- (ii) Sub-mountainous tracts.
- (iii) Dry Regions.
- (iv) Moist Regions.

(b) Name three Indian birds against each of the following categories :—

- (i) Beautiful birds.
- (ii) Singing or whistling birds.
- (iii) Fighting birds.
- (iv) Water birds.
- (v) Birds hunted for their flesh (except pigeons, sparrows and ducks).
- (vi) Name some birds which build highly complex nests. What necessity drives them to so build their nests?
- (vii) Birds whose young ones are born with sight and who leave the nest within a few hours on hatching.

Ans. (a) (i) Cypress, Pine, Deodar.

(ii) Willow, Farsh and Kela.

(iii) Teak, Sal, Kikar, Jand.

(iv) Evergreen Oakes, Horse Chestnuts, Birch.

(b) (i) Peacock, Parrot, the Black-bird with its glossey, velvet like feathers.

(ii) Cucco (Koel), Lark, and the Thrush.

(iii) Falcon, Fowl, Eagle.

(iv) Swan, Water fowl, Diver (or the loon).

(v) Partridges, Plover and Snipe.

(vi) The passiriforms or the perching birds like the finches, sparrows, warblers, crows, nightingales, thrushes, wrens and starlings etc. They build complex nests because their young ones are born blind, helpless and bare of coverings,

(vii) Game birds.

Q. 105. Describe the national flags of the following countries :—

(a) **India** (b) **Pakistan** (c) **The U. S. A.** (d) **The U. S. S. R.**
(e) **Great Britain** (f) **France.**

Ans. (a) India's national flag : Saffron, white, dark green (horizontal) ; with Ashoka's Wheel in navy blue in centre of the White.

(b) Pakistan's national flag : Dark green with a white verticle bar at the mast, the green portion bearing a white crescent in the centre and a 5-pointed white heraldic star. The white portion is one quarter of the size of the rectangular flag.

(c) U. S. A's national flag : 7 red, 6 white alternating stripes, horizontal ; with a blue canton, and displaying 48 white 5-pointed stars, one for each state.

(d) National flag of the U. S. S. R : Red with sickle and hammer in gold in the upper corner near the staff, and above them a 6-pointed star bordered in gold.

(e) The British National flag is the Union Jack, a combination of the crosses of St. George, St. Andrews and St. Patrick, the patron saints respectively of England, Scotland and Ireland.

(f) National flag of France is divided into three equal vertical stripes, blue, white and red, the last two being in the middle and at the end respectively.

Q. 106. Name three Indian trees against each of the following :—

(i) **The most shady trees.**

(ii) **The most gorgeous flowering trees.**

(iii) **Trees yielding the best timber.**

(iv) **Trees bearing the choicest fruits.**

(b) **Give three names against each of the following of creatures which do most damage to food or fruit crops in India :—**

(i) **Wild animals.**

(ii) **Birds.**

(iii) **Rodents.**

(iv) **Insects.**

Ans. (a) (i) The most shady trees are : The Pipal, The Bunyan and Mulberry.

(ii) The most gorgeous flowering trees are *Amaltas* *Dhak* and *Gul Mohar*.

(iii) Trees yielding the best timber are teak, sheesham and deodar.

- (iv) Trees bearing the choicest fruits are the mango tree, the pomegranate tree and the apple bearing tree.
- (b) (i) Wild animals : The Monkey ; the Black Bear and the Wild Elephant.
- (ii) Birds : Parrot, the pheasant and the partridges.
- (iii) Rodents : The bandicoots, rabbit, rat.
- (iv) Insects : The snail, grass-hoppers and locusts,

Q. 107. Answer the following :—

(a) Which has the larger population, France or Italy ?
 (b) which is near the sun, Mars or Saturn ? (c) what is a nebulae ?
 (d) what races of mankind are called The Mongolian, and in what countries are they chiefly found ? (e) which is the capital of Canada : Quebec or Ottawa ? (f) which are the countries inhabited by the Berbers, the Fellahin, the Karens, the Hova, the Magyars, the Bantus and the Waloons ? (g) which is nearer to the equator, Calcutta or Cape town ? (h) mention the countries in Europe which are more or less under the political influence of Russia.

Ans. (a) Italy (b) Mars (c) Luminous masses of gaseous matter seen in the heavens through the telescope either spiral or chaotic in form (d) People belonging to the Mongolian race are those who are distinguishable by their having straight hair which has a circular section under the microscope, oblique eyes and high cheek bone. The race consists of the Burmese, Chinese, Japanese, Koreans, Siamese, Tibetans, Laplanders, Finns, Magyars of Hungary, Tartars, Turks, many Russians and the Red Indians of America (e) Ottawa (f) Berbers inhabit North Africa ; The Fallahin Egypt ; The Karens Burma ; The Hova Madagascar ; The Magyars Hungary ; The Bantus South Africa ; The Waloons Belgium (g) Calcutta (h) Poland, Rumania, East Germany, Czechoslovakia, part of Austria, Bulgaria, Hungary.

Q. 108. Write short notes on the following :—

- (i) Chindits.
- (ii) Viet-Minh.
- (iii) Stern Gang.
- (iv) Comintern.

Ans. (i) Chindits was the name given to troops of the 3rd Indian division (the Long Range Penetration group) who fought as guerillas in Burma behind the Japanese lines during the 2nd World War. They included British, Gurkhas, West Africans and Americans.

(ii) Viet Minh is the name given to the Communist guerillas in Indo-china fighting under Dr. Ho-Chi-Minh in an effort to drive out the French from their country. The name is also applied to the territory now held by them.

(iii) Stern Gang: A terrorist organization of the Jews in Palestine which aimed at ousting the British by terrorist methods and later on helped the Jewish military to fight against the Arabs and Arab states that attacked Israel in 1948

(iv) Comintern was the name given to the 3rd Communist International founded at Moscow in 1919, which like the earlier international bodies set up Socialist and Labour Organizations to co-ordinate their activities. After the triumph of Hitler in 1933, it advocated a popular front of Communists, Socialists and Liberalists to fight Fascism. It was dissolved in 1943.

Q. 109. Where are the following and what are they noted for?—

- | | |
|--------------------|---------------|
| (a) Assouan. | (f) Bikini. |
| (b) Lake Superior. | (g) Tel Aviv. |
| (c) Lake Success | (h) Uri. |
| (d) Hampi. | (i) Gersoppa. |
| (e) Hirakud. | (j) Ellora. |

Ans. (a) Assouan is one of the biggest of dams, built on the Nile in Egypt. It derives its name from the city near by at the southernmost part of Egypt.

(b) Lake Superior is the largest fresh water lake in the world ; part of it lies in the U.S.A. and the other in Canada.

(c) Lake Success is the district of Long Island, New York. It is the site of the headquarter of the U. N. secretariat.

(d) See answer to (c) part of question 60.

(e) Hirakud is a multipurpose dam in Orissa about 150 ft. high across the Mahanadi, about 9 miles above Sambalpur in that state. There are being excavated canals on either side of the dam and there are to be two hydro-electric installations. It will provide irrigation to about 2 million acres of land and generate 200,000 k.w. of power. It is expected that the project alone will yield 340,000 tons of food grains and 34,000 tons of cash crops like cotton and sugarcane. The power will be used for Tata Steel and Iron Works at Jamshedpur etc

(f) Bikini is an atoll in the Pacific, north west of the Marshall Islands, where in 1946 atom bomb tests were carried out by the U. S. army and navy.

(g) Tel Aviv was once the capital of Israel, situated on the Mediterranean. It is about 33 miles north west of Jerusalem, the new capital of this state.

(h) Uri is a village on the Kohala-Srinagar road, about midway between the two and lying on the cease-fire line. Scene of battle between the Indian forces and tribal invaders led by Pakistani forces.

(i) Gersappa is a well known waterfall in Mysore.

(j) Ellora is a village in former Hyderabad state famed for its Buddhist and Hindu caves and monolithic temples, the most remarkable of which is the Hindu temple of Kailash.

Q. 110. Explain briefly the geographical position and importance of :—

(a) The Dardanelles (b) Alexandria (c) Pearl Harbour (d) Marseilles (e) Buenos Aires.

Ans. (a) The Dardanelles is a strait extending between the Sea of Marmora and the Aegean Sea. It separates Europe from Asia Minor. Because of this position it has played a great part in history. The most famous early event being the bridging of the straits by Xerxes. During World War I, the allies attacked the Turks here and suffered defeat. In 1941 it was the gateway to Russia from the Mediterranean but Turkey, as neutral refused passage of it. Its fortifications were so strong that no attempt on it was made by sea. Russia wants to get control of it to get access to ice free waters.

(b) Alexandria is the chief port of Egypt, between the Mediterranean and Lake Maryat. Because of its situation between the East and the West it has remained a great centre of learning as also a place of great commerce, though it has materially decayed since the opening of the Suez Canal. The Egyptian cotton trade passes through it. It is also historically important as a place containing many great antiquities.

It contained one of the Seven Wonders of the World, the first Light house, and Obelisks called Cleopatra's Needles, all of which have unfortunately either disappeared or been removed.

(c) Pearl Harbour is the U. S. Pacific naval base in Oahu, which is chief of the Hawaiian islands. The naval base enables the U.S.A. to be at a striking distance of the mainland of Asia and to defend the U. S. A. half way from any attack from the East.

(d) Marseilles, is the seaport of France on the shores of the Gulf of Lyons on the Mediterranean

The importance of Marseilles lies in the fact that it is an international port chiefly for passenger traffic; for as many as 66 lines normally call here, enabling travellers between north-west Europe and the orient to avoid the detour around the Iberian peninsula. Its great goods traffic also reflects its primary commercial interest in North Africa and the Orient, for it is a great outlet

for France's oil, wines, sugar, textiles, coal, soap and imports f
abroad.

(e) Buenos Aires is the capital of the Argentine Republic, on the river Plate about 150 miles from the Atlantic. It is the principal Argentine port and the centre of its imports and exports,

Q. 111. What are approximately the areas of ?

Africa, Australia, South America, the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, area of the surface of the Earth, area of water surface of the earth and area of land surface.

Ans. Africa 11,500,000 sq. miles, Austria, 2,975,000 sq. miles, South America 6,900,000 sq. miles ; The Pacific Ocean 64,000,000 sq. miles ; the Atlantic Ocean 41,000,000 sq. miles ; The Indian Ocean 29,000,000 sq. miles, Area of the Earth's surface 196,950,000 sq. miles ; area of water surface 139,440,000 sq. miles and land surface 57,510,000 sq. miles.

Q. 112. In which countries are situated the following ?

Lake Superior, Great Salt Lake, Lake Maracaibo, Lake Nyasa, Lake Rudolf, the Dead Sea, Lake Balkash, Lake Ladoga and Lake Manitoba.

Ans. Lake Superior and Great Salt Lake are situated in North America ; Lake Maracaibo in South America ; Lake Nyasa in East Africa and Lake Rudolf in Africa between the Sudan, Kenya and what was formerly Italian East Africa ; the Dead Sea is in Palestine ; Lake Ladoga is in Europe, situated almost equally in Russia and Finland, Lake Balkash is in Siberia in Kazak S. S. R. ; and Lake Manitoba is in Canada,

Q. 113. (a) What are the following ?

(i) Oases (ii) Steppes (iii) Glaciers (iv) Horse Latitudes (v) Neap and Spring Tides (vi) Trade Winds (vii) A veld (viii) Fauna and Flora (ix) Canyon (x) Ursa Major (xi) Ursa Minor.

(b) Mention the chief rivers which a coasting vessel, leaving Calcutta has to pass by the time it reaches Karachi.

Ans. (a) (i) Any fertile spot of land watered by a lake, a river or a spring in the heart of a desert is called an Oasis. The Sahara in Africa abounds in them. **(ii) Steppes** is the name given to barren treeless plains of the south east of Russia and south west of Siberia **(iii) Glaciers** are immense consolidated masses of snow, which are gradually impelled by their own force down the mountain sides until they reach a point where the temperature causes them to melt and the melted water runs off in streams **(iv) Horse latitudes** are the belts of calm between the regions of trade winds

and westerlies of higher latitudes. This term was coined during the time of sailing vessels, when horses formed part of a cargo. During long periods of calm, when sailing ships could not move forward, the horses had to be thrown into the sea on account of scarcity of water or when fodder ran short. (v) During new and full moon, both the sun and the moon are on the same side of the earth, the result is that both the lunar and solar tides are heaped one on the other and a very high tide, called the *spring tide* is formed. When the sun and the moon are 90° apart they are diametrically opposed and a very small tide, called a *neap tide*, results (vi) *Trade winds* are the winds which blow almost continuously in tropical seas and blow inwards from north-east and south-east towards the equatorial region of low pressure. They generally move north and south in sympathy with the seasonal changes in the sun's declination. The monsoons in India are trade winds (vii) *Veld* is the name given in South Africa to open unforested or thinly forested, grass country (viii) The collective plant, or vegetable and animal species of a region or country are called its *Flora and Fauna* respectively (ix) a *Canyon* is a deep gorge or ravine between high and steep banks worn by water courses (x), (xi) *Ursa Major* and *Minor* are The Great and Little Bear, which are two constellations of the North Hemisphere.

(b) Mahanadi, Godavari, Krishna, Panar, Palar, Cauvery, Tapti, Nerbada, The Sind joined with its tributaries.

Q. 114. In what countries are the following ports ?

Port Blair, East London, Leghorn, Halifax, Marseilles, Tuticorin, Haifa, Rotterdam, Ostend, Sydney, Semarang, Oslo, Plymouth, Seattle, Lisbon and Rio de Janeiro.

Ans. Port Blair—Andaman Islands ; East London—Cape Province, South Africa ; Leghorn—Italy ; Halifax—Canada ; Marseilles—France ; Tuticorin—India ; Haifa—Israel ; Rotterdam—Netherlands ; Ostend—Belgium ; Sydney—N. S. W. Australia ; Semarang—Java ; Oslo—Norway ; Plymouth—England ; Seattle—U. S. A. ; Lisbon—Portugal, Rio-de-Janeiro—Brazil.

Q. 115. Answer the following :—

(a) Which is regarded as the coldest place on earth ?

(b) Which places on earth are the hottest ?

(c) Which places on the earth are the driest and what are the average rainfalls there ?

(d) Which is the wettest state in India ?

(e) With what famous men are associated Bethelhem, a nath, Stafford-on-Avon, Santiniketen, St. Helena, Mecca, Assisi, Ayodhya, Pondicherry, Porbandar.

(f) Which are the possessions in India still under Portugal ?

(g) In which direction does air flow from high to low pressure regions in the Northern and Southern Hemispheres ?

Ans. (a) Verkhoyansk in Siberia, (b) Death valley in California, Aziziah in Libya and In-Salah in Algeria, (c) Death valley in California (rainfall 1 inch), Africa (a village) in Chile (rainfall about 1 inch) and Central parts of Australia (d) Assam (e) Bethlehem with Jesus Christ ; Sarnath with Gautama Buddha ; Stafford-on Avon with Shakespeare ; Santiniketan with Dr. Rabindranath Tagore ; St. Helena with Napoleon Bonaparte ; Mecca with Prophet Mohammad ; Assisi with St. Frances ; Ayodhya with Shri Ramchandra ; Pondicherry with Aurobindo Ghosh ; Porbandar with Mahatma Gandhi (f) The Portuguese possess Goa, Daman and Diu, (g) Air travels to the right of the direct path from high to low pressure regions in the Northern Hemisphere and to the left in the Southern Hemisphere.

Q. 116. Arrange the following agricultural products against the categories given below :—

Maize, Jute, Sugar cane, Cotton, Mustard, Wheat, Linseed, Chillies, Tea, Gram, Castor seeds, Palak, Peas, Oats, Rice, Potato, Arhar, Onions, Tobacco, Turnip, Coffee, Bajra, Pumpkin, Til, Poppy and Hemp.

(a) Superior foodgrains.

(b) Coarse foodgrains.

(c) Oil seeds.

(d) Commercial crops.

(e) Vegetables.

Ans. (a) Superior Foodgrains : Wheat, Oats, Rice.

(b) Coarse Foodgrains : Maize, Gram, Bajra.

(c) Oil seeds : Linseed, Castor seeds, Til, Monkey nuts, Pumpkin.

(d) Commercial crops : Jute, Sugar cane, Cotton, Chillies, Poppy, Hemp, Tea.

(e) Vegetables : Palak, Peas, Potatoes, Onions.

Q. 117. With what commodities are the following trade names associated ? :—

Firestone ; Cobra ; Slazenger ; Blackbird ; Lifebuoy ; Lalimili ; Will's Shell ; Kodak ; Hamam ; Bayer ; Blackstone ; Players ; Polson's ; Underwood ; Goodyear and Horlicks.

Ans. Firestone—motor tyres ; Cobra—boot polish ; Slazenger—tennis balls ; Blackbird—fountain pen ; Lifebuoy—soap ; Lal-

Imli—woolen textiles ; Will's —cigarettes ; Shell—petrol ; Kodak—film and photographic goods ; Hammam—soap ; Bayer—medicines ; Blackstone —oil engines ; Players—cigarettes ; Underwoods—typewriters ; Goodyear—motor tyres ; Horlick's—malted milk.

Q. 118. What are trace of ancient Indian civilization found in Indonesia ?

Ans. Borobudur, Parambann, Manut and Bali temples and the traditions of Bali dance, with Hindu religion still surviving in the Bali Island are clear proofs of Indian civilization influencing Indonesian islands.

Q. 119. What and where are following ?

- | | |
|------------------|-----------------|
| (i) Azarbajan | (vi) Bikini |
| (ii) Eritrea | (vii) Izmir |
| (iii) Heligoland | (viii) Helsinki |
| (iv) Memel | (ix) Manchukuo |
| (v) The Kurlies | (x) Trieste |

Ans. (i) Azerbaijan is a constituent S. S. R. of the U. S. S. R. in the south east of Europe on the south west coast of the Caspian Sea.

(ii) Eritrea is the former Italian colony in East Africa. On its south west is Ethiopia and on its north east is the Red Sea. It has now become a Federal part of Ethiopia.

(iii) Heligoland is an islet of the North Sea off the mouth of the Elbe.

(iv) Memel is a port on the Baltic Sea which before World War II belonged to Germany, but has now been incorporated in the Lithuanian S. S. R.

(v) The Kurilies are chain of 47 small islands stretching from the north east of Hokkaido island of Japan to the south of Kamchatka. They now belong to the U. S. S. R.

(vi) Bikini is an atoll in the Pacific North West of the Marshall Islands, where in 1946 the U. S. A. Military carried on atom bomb tests.

(vii) Izmir is a city of Turkish naval base. Its old name was Smyrna.

(viii) Helsinki is the capital of Finland, a seaport on the Gulf of Finland.

(ix) Manchukuo is the name of a puppet state which was set up by the Japanese in 1932 after conquest of Manchuria. It has again been reverted to China after the collapse of Japan. It is the N. E. portion of China.

(x) Trieste is a free port on the Adriatic, it was a bone of contention between Italy and Yugoslavia.

Q. 120. (a) Name five of the principal agricultural products of India.

(b) Name five of the principal industries in India.

Ans. (a) Five of the principal agricultural products of India are :—

(a) Rice, wheat, millets, pulses and sugar cane

(b) Five of principal industries of India are :—

Cotton textiles, Iron and steel industry, cement industry, the sugar industry and the tea industry.

Q. 121. What do you understand by the following ?

(i) Hall Mark.

(ii) Greenwich Mean Time.

(iii) Plimsol Line.

(iv) Statute of Westminster.

(v) Hansard.

Ans. (i) Hall mark. This is an official mark stamped on gold and silverwares after the articles have been vigorously tested ; by this the standard of the precious metal contained, its country of origin, maker and date are easily recognized.

(ii) Greenwich mean time—This is the standard time for the British Isles and western Europe, being Local Time for the British Isles at Greenwich observatory, London, on the zero-meridian.

(iii) Plimsol Line is the name given to the circle with a horizontal line marked on the side of every vessel to indicate to what depth she may be loaded in salt water.

(iv) Statute of Westminster is the Act passed by the British Parliament in 1931. defining the relationship between Britain and its self governing Dominions. By this Act, the right of the British parliament to legislate for the Dominions or to disallow bills passed by them was abolished. Henceforth they were empowered to repeal or amend any Act of the British parliament applying to them.

(v) Hansard is the title given to official reports of the proceedings of the British Parliament.

Q. 122. What and where are the following :—

Monte Carlo.

Kaaba.

Croydon.

Harley street.

Oval.

Heights of Abraham.

Chowringee.

Frenchman's Flat.

Middle Temple.

Ans. Monte Carlo is a town in Monaco famous for its gambling tables ; Croydon is a country borough about 10 miles south of London. It was London's principal airport before World War II ; The Oval is a cricket ground, the head-quarters of the Surrey County Cricket Club, at Kennington, London, Chowringhee is a well known square in Calcutta ; Middle Temple is an Inn of Court in London ; Kaaba is sacred shrine of the Moslems in the mosque at Mecca ; Harley street is in Marylebone, London, the centre of English Medical profession ; Heights of Abraham is an elevated plain south west of Quebec. Here on Sept. 13, 1759, the French were defeated by the English general Wolfe, whereby Canada became a part of the British Empire. It is now the National Battlefield Park, Freachman's Flat is the Atom Bomb testing ground in Nevada, U. S. A.

Q. 123. Name the country where live or lived.

- | | |
|-----------------------|-------------------|
| (a) The Magyars | (i) Maoris |
| (b) The Flahins | (j) Moors |
| (c) The Gauls | (k) Negrilos |
| (d) Incas | (l) Slavs |
| (e) Samurai | (m) Bhadarlok |
| (f) Mandarins | (n) The Magians |
| (g) Grandees | (o) The Sumarians |
| (h) The Aztec Indians | |

Ans. Magyars in Hungary ; Flahins in Egypt ; The Gauls in France ; Incas in Peru ; Samurai in Japan ; Mandarines in China ; Grandees in Spain, The Aztec Indians in Mexico ; Maoris in Newzealand ; Moors in Morocco ; Negrillos in the African Congo ; Slavs in central and eastern Europe now including the Russians, Bulgarians, Serbians. Croats, Slovenian, some Hungarians, Czechs, Slovaks and Poles ; Bhadarlok in Bengal ; The Magians in Persia ; the Sumerians in Iraq.

Q. 124. Name all the states with their capitals which make the Republic of India.

Ans. Following are the states which make the whole of India. The capitals are given within brackets for each state.

Assam (Shillong) ; Bihar (Winter : Patna, Summer : Ranchi) ; Bombay (Bombay) ; Madhya Pradesh (Winter : Bhopal, Summer : Pachmari) ; Madras (Winter Madras, Summer : Octackmud) Orissa (Cuttack) ; East Punjab (Chandigarh) ; Uttar Pradesh (Winter : Lucknow, Summer : Nainital) ; West Bengal (Calcutta) ; Jammu and Kashmir (Srinagar) ; Mysore (Bangalore) ; Andhrs (Hyderabad) ; Rajasthan (Jaipur) ; Kerala Trivandrum) ; Tripura (Agartala) ; Andaman and Nioobar (Port Blair) ; Sikkim (Gangtok) ; Manipur (Manipur) ; Delhi (Delhi).

Q. 125. Answer the following :—

- (a) What is the length and breadth of the Union of India ?
- (b) What are the lengths of the land sea frontiers of India ?
- (c) Name some harbours in India which are natural and those which are purely artificial. What is the reason for this ?
- (d) If you sailed from Calcutta along the sea coasts upto Karachi in the west, what ports will come in your way ?
- (e) Where do we have the black soil in India, and what are its main agricultural products ?
- (f) What kinds of houses would you find in Assam and why ?

Ans. (a) India is about 1700 miles from east to west and about 2,000 miles from north to south.

(b) The land frontier is about 8200 miles, while the sea frontier is about 3500 miles.

(c) Bombay and Goa are natural harbours, while Vishakhapatnam, Madras and Okha artificial.

The reason why the former are natural is that the west coast is rocky and the water near it is quite deep, but in the east the sea is extremely shallow, so ocean going steamers have to weigh anchor at a great distance. Madras and Vishakhapatnam have therefore been built as artificial harbours.

(d) The order will be as follow :—

Calcutta, Vishakhapatnam, Coconada, Masulipatam, Madras, Pondicherry, Cuddalore, Karikal, Nagapattinam, Dhanushkodi, Tuticorin, Quilon, Alleppey, Cochin, Calicut, Mangalore, Marmagao, Bombay, Surat, Porbunder, Port Okha, Port Kandla and Karachi.

(e) This is the fertile volcanic soil of N. W. Deccan, The soil is very retentive of moisture, which it holds long after the rain has ceased. Cotton is largely grown in this soil.

(f) Bamboo and wood which can easily float in water when there is excessive downpour which is so common.

Q. 126. What are the following places known for ?

- (a) Potsdam (b) Versailles (c) Jakarta (d) Noakhali (e) Flushing Meadows (f) Falkland Island (g) Mohenjo Daro (h) Elba (i) Nalanda (j) Angkor-vat.

Ans. (a) Potsdam is associated with the Potsdam Conference held in July 1945, between President Truman, Marshal Stalin and Winston Churchill, which laid down the principles governing the treatment of Germany in the initial period of Allied control.

(b) Versailles is famous for the treaty of peace concluded here after World War I on June 28, 1919 between the Allied and Associated Powers on the one hand and Germany on the other.

(c) Jakarta is the capital of the newly formed Indonesian Republic.

(d) Noakhali in East Bengal is the place where Hindu Muslim riots started in pre-partition days.

It is indissolubly connected with the famous march to it of Mahatma Gandhi, undertaken with a view to ease tension between the two communities.

(e) Flushing Meadows in New York is the site of the U.N.O. Secretariat.

(f) Falkland Islands in the South Atlantic are known for their great whale and seal industries. They are also associated with the British Naval victory of the Great War when in 1914, the German fleet under Admiral Van Spee was destroyed.

(g) Mohenjodaro in Pakistan is the site where excavations have revealed the Indus Valley civilization.

(h) Elba island in the Mediterranean was the place of exile of Napoleon in 1814-15.

(i) Nalanda in Bihar is associated with the famous ancient Indian University of Nalanda.

(j) Angkor Wat in Cambodia is one of the most imposing edifices in the world lying now in ruins, built by the Khmers—the ruling class—between 10th and 12 centuries A. D. It represents the influence of the Hindu civilization that had penetrated this far off land in ancient times.

Q. 127. Give an outline of the multipurpose development of the river valleys of India.

Ans. The new projects whether for irrigation or for power generation are designed on an extended and ambitious scale. They are known as multi-purpose projects since they are designed to provide for irrigation, hydro-electric power, flood control, navigation, prevention of soil erosion, recreational facilities and fish culture.

The completion of the plans and the irrigation and power schemes already under execution will, it is estimated, provide facilities for an additional area of about 42 million acres, and the additional food supply is likely to be of the order of 14 million tons. They are expected to provide, besides, hydro-electric generating capacity of about 7 million k. w.

There are at present a number of schemes small and large in different parts of the country, 12 of them being called major projects. Eight of these are multipurpose in their scope, three are

power schemes, while one is a purely irrigation scheme. Most important of these are the following :—

(1) In West Bengal is the Damodar Valley Project

This is one of the most gigantic of projects on which much hope has been built. It comprises the construction of eight dams on the Damodar and its tributaries, and one barrage at Durgapur 15 miles from Raniganj, from which two canals will take off, one on each side. The first dam is across the Barakar at Tilaiya in Hazaribagh district which will irrigate over 30,000 acres. The second is the Maithon on the Barakar above its confluence with the Damodar, 15 miles north-east of Asansol. One dam each has been constructed on the Konar and the Bokaro tributaries of the Damodar. When completed, the project will provide perennial irrigation to one million acres and generate 300,000-KW. of power of which 200,000 will be from thermal generating plants. A semi-autonomous Damodar Valley Corporation has been set up consisting of the representatives of the Central Government and the Governments of West Bengal and Bihar.

(2) In Orissa the Hirakud Dam Project is the first of the

three projects to start. It comprises the construction of a dam 150 feet high across the Mahanadi about 9 miles above Sambalpur in Orissa. The storage capacity of the reservoir is 5.3 million acre-feet ; there will be canals on either side, and two hydro-electric installations. It will provide irrigation to over 1 million acres of land, generate 350,000 K.W. and provide navigation facilities. It is estimated that this project alone will yield 340,000 tons of food grains and 34,000 tons of cash crops like cotton and sugar cane. The power will be used by the Tata Steel and Iron Works at Jamshedpur for their furnaces and rolling mills and for the forest and untapped mineral wealth of this backward state and thus help to raise the standard of living of the people. The project will reduce the Mahanadi floods, make it navigable down to the sea, and irrigate large tracts in the Sambalpur district and Sonepur State and the delta region.

(3) In East Punjab the Bhakra Dam Project across a gorge in the river Sutlej in the East Punjanb is one of the most important multipurpose projects on which much work has already been done. It comprises a dam 484 feet high across the gorge at Bhakra, which is about fifty miles above Rupar, in the Ambala District, and will store 35 million acre-feet of water which will provide 6,600 cubic feet of water per second for a period of about nine months during the dry part of the year. The irrigation system will command an area of 4.5 million acres through 200 miles of lined canals and a net-work of distributaries. It will also generate 160,000 KW. of power.

The Nangal Power Project comprises a weir across the Sutlej and Nangal, 8 miles below the site of the Bhakra dam. A lined

canal will be taken off for three power houses about 12 and 18 miles downstream of the weir. Each power house will be operated by a fall of 98 feet and its power will be augmented by that from the Bhakra project.

It is expected that when the whole project is complete, it will provide for the generation of 400,000 KW. of power, while 130,000 tons of food grains and 800,000 bales of cotton will be additional yield per annum, helping the industrialization of the state and making it a granary of the country.

The Government of India has recently constituted a Control Board and an Advisory Board to ensure the early, efficient and economic execution of the Bhakra Nangal Project.

(4) **Rajputana.** It is a semi desert and there are no big rivers flowing through it, still the states of Gwalior, Jaipur and other small states are developing their schemes.

Rajasthan's Chambal Valley Project. A multi-purpose development project costing nearly Rs. 31 crores and capable of generating 7,75,000 k.w. of electrical energy and yielding over 1,00,000 tons of food grains every year is under construction in Rajasthan.

The scheme known as the Chambal Valley project consists of three power dams and a barrage with canals on either side of the river Chambal which takes its origin in the northern slopes of the Vindhayan range and flows through Madhya Pradesh and Rajasthan for a length of about 600 miles before joining the Jumna in U. P.

The uppermost dam, known as the Gandhisagar dam is in Madhya Pradesh State, the next two dams—the Rawatbhata (Bhupal Power Project) dam and the Kotah dam, and the Kotah barrage, the lowermost being in Rajasthan State.

The Rawatbhata dam is being built about 20 miles downstream of the Gandhisagar dam and at a distance of about 32 miles from Kotah city in Rajasthan.

The Kotah dam is a "pick up" dam only and is being built in the gorge about 20 miles downstream of the Rawatbhata dam and ten miles above the Kotah city.

The Kotah barrage will be built about 15 miles downstream of the Kotah dam and about six miles below Kotah city. The water from the turbines at the Kotah dam passing into the river will be picked up at the barrage and utilized for irrigation.

The total irrigation from these canals in Rajasthan state will be about 3,00,000 acres with a further possibility of irrigation of 3,00,000 acres of land in the Madhya Pradesh State. Besides irrigation, 7,500 k.w. seasonal power will also be developed at the power station just below the barrage.

Q. 128. Write short notes on the following :—

- | | |
|------------------------|---------------------------|
| (i) Mount Everest | (iv) The Rajputana Desert |
| (ii) Monsoon | (v) The Deccan Plateau |
| (iii) The Brahmaputra. | |

Ans. (i) Mount Everest on the Tibet-Nepal frontier is the highest peak of the Himalayan range, and highest in the world, 29,002 ft. in height. It was named after Sir George Everest when he was surveyor-general of India. Many attempts to scale it were made by expeditions of various countries, mostly Swiss and English, but till 1952 all ended in failure. In 1953, a party was led by Sir Hunt, two members of which—Sherpa Tensing and Sir Edmund Hillary—were successful in reaching this unconquerable height.

(ii) **Monsoon.** Rain bearing seasonal winds which blow from the S. W. from across the Indian ocean during the months of April to September and visit India and countries of S. E. Asia, and from N. E. from December to March each year.

(iii) **The Brahmaputra** is one of the largest river of India, arising in the Himalayan glaciers as Tsang Po and runs for about 900 miles through Tibet, when it turns south and enters India near Jido, and flows through the Assam valley, where it is known as the Brahmaputra. From Assam it enters Pakistan and joining the Ganga falls into the Bay of Bengal.

(iv) **The Rajputana desert**, known also as the Thar desert, is approximately 300 miles by 380 miles situated mostly on the north-west of the Aravali mountain ranges which practically bisect this state. In its south and east it has some vegetation, mostly shrubs, and spare population, but in the north-west, specially in the Jaisalmer state and the portion bordering on Pakistan, it is a desert of sand dunes, and for miles on end there is no habitation, no animal, no shrub, it is all desolate, unrelieved by anything that may show any sign of life. The rain ranges from 5 inches to 10 inches, which make any vegetation impossible.

(v) **The Deccan Plateau** is a triangular shaped peninsula covering the whole of the southern part of the country south of the Satpura and Vindhya ranges. The plateau ranges in height from 1500 ft. to 4000 ft. It is higher in the west and the south than in the east and north. Along the western and eastern edges of the plateau run the western and eastern ghats respectively. These practically unite in the extreme south to form ranges of hills, most well known of which are Nilgiri hills.

Q. 129. What are the following famous for ?

- | | |
|----------------|-----------------|
| (i) Taxila | (vi) Budh-gaya |
| (ii) Gottingen | (vii) Pittsburg |

(iii) **Sarnath**(viii) **Mount Abu**(iv) **Luxor**(ix) **St. Peters Cathedral**(v) **Seringapattam**(x) **Mohenjo-Daro**

Ans. (i) Taxila is a town in N. W. Punjab, famous for the excavations by Sir John Marshall. It was an old seat of Buddhist culture.

(ii) **Gottingen** is a town in Prussian province of Hanover in Germany, chiefly noted for its famous university founded in 1734.

(iii) **Sarnath** near Banaras is known for Buddhist temples. It was in the Deer Park at Sarnath that Buddha gave his first religious discourse, as the result of which five disciples joined him, who were the nucleus of the Great Buddhist church or order.

(iv) **Luxor** in Egypt is the site of ancient Thebes and contains numerous ruined temples.

(v) **Seringapattam** in Mysore is famous for its shrine of Vishnu, fortress and Haider Ali's mausoleum.

(vi) **Budh-gaya** has the sacred pipal tree associated with the memory of the Buddha, meditating under which he got the enlightenment which made him the Buddha or the Enlightened One.

(vii) **Pittsburg** is the 2nd largest city of Pennsylvania, U.S.A. It is the centre of the richest coal field in the country and has developed many steel industries.

(viii) **Mount Abu** in the Aravali hills, Rajasthan, is famous for its Jain temples, known as the Dilwara temples.

(ix) **St. Peters Cathedral** is the largest and the oldest cathedral in the world. In Rome.

(x) **Mohenjodaro** in West Punjab (Pakistan) in the Montgomery district is the site of excavations of an ancient pre-historic town which reveals the ancient Indus-Valley civilization.

Q. 130. Which of these are Republics, Monarchies, Colonies, Trust countries or Protectorates. Name the countries of which some of these are Colonies, Trusts or Protectorates :—

Zanzibar, Western Sahara, Uganda, Tanganyika, Mozambique, Netherland, Nayasaland, Philippines, Sweden, Syria, Cameroons, Colombia, Denmark, Gambia, Greenland, Iraq, Libya, Mauritania, Albania, Basutoland, Bermuda and Bismark Archipelago.

Ans. Zanzibar is British Protectorate; Western Sahara Spanish Colony; Uganda British Protectorate; Tanganyika British Trust; Mozambique Portuguese Colony; Netherland monarchy; Nayasaland British Protectorate; Philippines republic; Cameroons part French Trust and part British Trust; Colombia republic; Denmark monarchy; Gambia British Colony and Protectorate;

Greenland Danish Colony ; Iraq republic ; Libya monarchy ; Mauritania French Colony, Albania republic ; Basutoland British Protectorate ; Bermud a British Colony ; Bismarck Archipelago Australian Trust.

Q. 131. Write notes on the production and use, if any, in India of the following :—

(i) Coal

(iii) Mica

(ii) Petroleum

(iv) Manganese Ore

Ans. (i) Coal. India ranks among the first ten countries of the world in the production of coal, but our production is far behind giants like the U. K., U. S. A. and U. S. S. R. The distribution is quite uneven. Coal deposits are chiefly found in Bengal, Bihar, Orissa and Madhya Pradesh. The most important mines are Raniganj in Bengal, Jharia and Giridi in Bihar, Chanda, Korba, Jhilmili, Kanhan in Madhya Pradesh, Singrani in Andhra, Karanpura and Talchar in Orissa. Jharia and Raniganj account for 70% of the best coal produced in the country. We produce about 38 million tons of coal per annum. It has been estimated that we have about 2000 million tons of coal in all, Coal is mainly used up by the railways, iron and steel works, textile mills and electric supply companies. Together they account for two third of the total coal despatched from mines, the railways alone taking one half of it. The other uses to which coal is put is making coal gas and coal tar, but they are not in extensive use in our country.

(ii) Petroleum. The Indian Union produces very little of petroleum. Due to separation of Burma and partition of the country we have lost important fields in Burma and Pakistan. We are left only the Assam fields, though constant effort is being made to discover oil deposits in Bengal and Brahmaputra valleys, and Cambay where oil beds seem to exist. We are at present producing about 70 million gallons from Assam fields, mostly in the Digboi fields, but this satisfies only 5% of our needs. We have therefore to depend upon imports of petroleum. From petroleum we produce petrol, light heavy naphtha, paraffin oil, or lamp oil, vaseline and paraffin wax.

(iii) Mica. Our country is very rich in the mica deposits which occur in Bihar, Ajmer, Rajasthan and Madras. She has practically the monopoly for mica deposits producing three-fourth of the world production. Our total production is about 10,000,000 cwt. Most of it is exported because of lack of electrical industries in our country. It is also used in aeronautics, as a lamp cover and as an insulator.

(iv) Manganese Ore. Manganese occurs in Madhya Pradesh, Bombay, Mysore, Madras, Bihar and Orissa. It is used in several industries, but chiefly in the steel industry and in making alloys. Next to Russia and Gold Coast, our country is the largest producer but most of it is exported, because the industries in which it can

be used are not fully developed. We are now producing about $1\frac{1}{2}$ million tons of this valuable ore, worth about 22 crores of rupees.

Q. 132. How and where are the following manufactured in India ?

(i) Pig Iron

(iii) Copper

(ii) Steel

(iv) Aluminium

Ans. (i) The Iron ore after being thoroughly cleansed, is smelted in a blast furnace which is a tall, circular structure about 100 ft. high and 20 ft. or more at the hearth and only slightly less at the top. The iron ore, coke and lime or limestone, as a flux, are charged by mechanical hoisting gear into the top of the furnace. Combustion is maintained at the hearth by blowing hot air at about 9000°C . Carbon dioxide and carbon monoxide escape from the top, while lime, silica and flux float on the liquid iron. The iron is either taken in a large ladle direct to steel works or cast into 'pigs'. The iron thus obtained is the pig iron. The following are the places where pig iron is produced.

Jamshedpur in Bihar (Tata Iron and Steel Works), Bengal Iron Company at Hirapur, Indian Iron and Steel Company at Burnpur near Asansol, Mysore Iron and Steel Company at Kulti.

(ii) Steel is prepared as follows :—

The pig iron is made into steel by heating to a temperature above the melting point of pure iron and by eliminating unwanted elements which remain in the pig iron, which are chiefly carbon, manganese, silicon and phosphorus by oxidation in conjunction with appropriate fluxes.

There are many processes, most important of which are :—(1) Bessemer (2) open hearth process (3) by Electric Furnaces. The companies mentioned above all produce steel.

(iii) Copper is obtained from copper pyrites by roasting the ores, so forming the oxide. This is then reduced to copper by heating with coke. Copper is mostly found in Singbhum mines in Bihar, also in small quantities in Chota Nagpur, Rajasthan, Kulu and Garhwal.

(iv) Aluminium is obtained by electrolysis of aluminium oxide dissolved in fused sodium aluminium fluoride.

The aluminium industry is yet in its infancy in India. Only two factories are producing it, but even they are not working to capacity.

Q. 133. Name the principal money crops of India and state briefly where and how they are grown.

Ans. The principal money crops of India are the following :—

Sugar cane, jute, tobacco, cotton, tea, coffee, oil seeds. The following are the states where they are chiefly grown :—

Sugar cane : East Punjab, Uttar Pradesh, Bihar, West Bengal, Madras, Bombay.

Jute : West Bengal, Assam, Orissa and Bihar.

Tobacco : Bengal, Bihar, Bombay, Madras, East Punjab, Orissa, Kerala, Madhya Pradesh and the Gulf of Cambay.

Cotton : Saurashtra, plains of Bombay, Madhya Pradesh, U. P., Andhra, Madras, East Punjab, Baroda and Rajasthan.

Tea : Darjeeling Assam, the Kangra district in East Punjab, Dehradun in Uttar Pradesh and the Nilgiri hill.

Coffee : Kerala, Mysore, Nilgiris and Coorg.

Oil seeds : All over India, but chiefly in West Bengal, Bihar, U. P., East Punjab, Berar and Madras.

How they are grown :—

Sugar-cane : Sugar-cane grows well in all those regions where the average rainfall is 60 inc. or there is ample supply of water and the average temperature reaches about 80° F. These conditions are present in all those parts of the Indian states where it is extensively grown, specially in Bihar and U. P. The land is ploughed deeply, and cuttings 8-10 in. long known as 'seed' made from the upper joints of old cane are fixed in trenches and nearly covered with soil. They begin to sprout in about two weeks and the crop is harvested when mature. The best season for cutting is when it is richest in sugar, usually when the flowers are beginning to fade.

Jute : The cultivation of Jute exhausts the soil more readily than any other crop. To grow it successfully every year the upper layers of the soil must be enriched. The Ganges-Brahmaputra delta is therefore most suitable for its cultivation, specially because the other condition that the plant flourishes best in damp heat is present in this region. The plant is sown in March and when it is mature in September it is cut and fibre—the part used for manufacture of gunny bags and ropes and other articles—is separated from the stem by retting i. e. steeping it in water tanks or stagnant pools for a period, varying from two or three days to some weeks.

Tobacco : Tobacco seeds are usually sown in beds and the young plants are moved on to carefully prepared ground and planted at sufficient distance to allow of growth. As soon as sufficient leaves have grown the point of the shoot is removed in order to prevent flowering. When the leaves begin to turn yellow they are collected, dried and fermented to deliver to the manufacturer.

Cotton : Cotton is grown like wheat by sowing its seed in especially prepared soil, which should be well watered by irrigation or it grows best in the black soil of the Deccan which retains moisture for long. There should be no rain in the picking period. In India hand picking is generally the only method used, though machinery is used at the ginnery.

Tea . Land is planted up with selected seed placed straight into holes. As the plant requires sufficient water which should not stick to the roots, the planting is done on slopes and hillsides in 'contour' fashion. During its growth the young plant is pruned at intervals to provide a main stem and lateral growth. The young leaves of the plant are picked, exposed to the air, roasted, rolled by hand and then dried.

Coffee : The coffee plant is grown like other bushes by means of its seed, but it requires a deep, well drained soil rich in humus. The manure is laid on the soil as a mulch which helps to keep the soil cool and moist and prevents surface wash during heavy rain. Plucking of flowers and drying is done as for tea.

Oil seeds : The important oil seeds are : rape, mustard, linseed, sesamum, groundnut, castor and cocoanut. They are grown like other shrubs, e.g., cotton.

Q. 134. State briefly what you know of the following :—

(i) Hieroglyphics (ii) Ajanta-frescoes (iii) Venus de Melo (iv) Mona Lisa.

Ans. (i). Hieroglyphics are the picture-writing of the ancient Egyptians existing about the middle of the 4th millenium B. C. and were in use upto the beginning of the Christian era. This mode of writing consisted of miniature pictures of men, animals and common objects of all sorts arranged in lines similar to those of modern printed pages, either incised or sculptured in raised relief on temple walls etc. This mode of writing was deciphered only when the famous "Rosetta Stone" of 197 B. C. carved in Hieroglyphic, Demotic and Greek furnished the key to decipherment.

(ii) The Ajanta frescoes are fine paintings on the walls of a number of caves—about twenty nine in number—which made up the cluster of caves carved out of solid rocks here. They seem to have been begun in the first century A. D., but were finished, most of them, during the Gupta Golden Age, when the art of painting in India had reached its zenith. An historian describes them thus : "A fine conception, brilliant colour, and admirable drawing invested these paintings with unique charm which we can only faintly realize in their present ruined condition. In addition to decorative designs as varied and graceful as they are fanciful, and executed with masterly skill they depict sacred objects and symbols, the figure of the Buddha and incidents of his life (including past lives described in the *Jataka* stories)".

(iii) *Venus de Mello* : Famous statue of Roman goddess Venus or Aphrodite—the goddess of love, carved in 400 B. C., which was discovered at Melos in 1820.

(iv) *Mona Lisa* is one of the greatest paintings of Leonardo da Vinci, which is a portrait of the wife of Zanoki del Giocondo now in the Louvre. It was done in 1504. The mystical smile has lent charm and mystery to the figure. This portrait has been ranked among the greatest of European painting.

Q. 135. Write short notes on the following from the structural and design point of view.

(i) **Pyramids** (ii) **Westminster Abbey** (iii) **Taj Mahal** (iv) **Skyscraper** (v) **The Howrah Bridge**.

Ans. (i) The Pyramids (of Egypt) have the shape of the geometric figure we associate with the true pyramid. These are ancient structures of stone or brick resting generally on square bases, and tapering upwards with triangular sides. Thus the pyramid at Saqqara stands about 200 ft. high, rising in a series of six steps, the base measuring 413 ft. by 344 ft. Another pyramid is the pyramid of Meidum, which was built as a step pyramid, for it is in three tiers, but each tier is coated so as to make a smooth surface. There is a pyramid at Dashur which is a true pyramid as it is without steps. The most famous is the Great Pyramid at Giza, built in successive stages; each step of it was completed and the next stage built above it in decreasing size each block of stone being keyed to the block below. The original height of the pyramid was 481 ft. Its base is an equal-sided rectangle measuring 456 ft. on each side. It has an entrance in the north. Its ascending passage is lined with fine ashlar masonry. The passage leads at a low level to the so called queen's chamber and at a higher level to the king's chamber. The pyramids are thus hollow inside having chambers in which the mummies of the ancient pharaohs were enclosed.

(ii) *The Westminster Abbey* was originally built on a marshy site that was once Thorney Island at the mouth of the Thames. Originally it was built in the style of a Norman Church by Edward the Confessor but its rebuilding was begun by Henry III in 1245 and was finished by 1528. The building on the whole is thus of the French type of plan with its 'chevet' of chapels worked out in terms of English details and sculpture of the highest excellence. The Abbey thus contains many French features, as for example rose windows, flying buttresses etc. The result has been called a great French thought expressed in excellent English. Some of the sculpture, such as the famous 'censing' angels are extremely beautiful. Later additions have been made to it in Henry VII's Chapel in the Gothic pointed style, with a beautiful roof of fan vaulting type. The West towers designed by Sir Christopher were added later and completed in 1740.

(iii) In structure and design the beautiful Taj Mahal is a mau soleum having an *enclosed polygonal chamber in a near square plan, surmounted by a large central and four small subsidiary domes*, all on a raised platform. A great feature of the Taj is the layout of gardens, watercourses, gates etc which make the building the focal point of the wider well planned design. The dome is built with horizontal layers of brick embedded in a heavy matrix of concrete, the whole shell having an average thickness of about 8 ft. The marble is only fixed outside in big slabs, so as to give the appearance of the whole being built in marble. Four minarets flank it, two on each side and give the whole a charming appearance.

(iv) *Skyscraper*. This is a high type of building which is a feature of Modern American architecture. They are constructed of stone and cement on a steel frame and are usually designed as office buildings, apartments or hotels. The "Zoning" principle in which the stories recede as the height increases, whereby the light and ventilation of the street and adjacent buildings are not unduly impeded and are strictly followed in most. Famous examples of this type of buildings are Empire State building 1248 ft. above street level, Crysler building 1046 ft, Wool Worth building 702 ft. etc. etc.

(v) *The Howrah bridge* is a steel arch bridge, in which the arch is hinged at two supports, one on each side of the river, the supports having been raised fairly high above the surrounding level ground, so as to make the central part of the bridge sufficiently high to enable small ships to pass under it.

Q. 136. Answer the following :—

(a) **What are the characteristics of a mediterranean climate ? Which countries of the world enjoy this type of climate ? What type of fruits would you find in these regions ?**

Ans. This is the type of climate experienced by lands bordering the Mediteranean Sea and also by other regions, in both hemispheres, situated in a similar geographical position. They are usually regions lying between 30° and 40° N. and S. latitudes. In these regions winters are moderate, with moderate rainfall; but summers are dry and hot.

These lands are :

(1) Land around the Mediterranean Sea. (2) Central California in the U.S.A. (3) Central Chile (4) The southern tip of South Africa (5) Parts of South-West and South Australia, Newzealand and Tasmania.

Characteristic fruits of these regions are :—

Grape, the olive, figs, and the citrus fruits—orange, lemon etc.

Q. 137. (a) What is the Nebular Hypothesis ?

(b) What is a Nor'-Wester ?

(c) Which are more saline. The Mediterranean or the Atlantic, The Baltic or the Red Sea. Why ?

(d) What is an alluvium. Where do you expect to find it most ?

(e) What is Anthracite ? What is the difference between it (i.e. Anthracite), Lignite and Bituminous coal.

(f) What is an Aphelion ? When is this position reached by the earth ?

(g) What do you understand by Biogeography ?

(h) What region of India is called the Black Cotton-Earth. What are the characteristics of the soil in that region ?

(i) What is a continental climate ? What are its main characteristics ?

Ans. (a) According to the Nebular hypothesis, the entire matter of the solar system was once a nebula, a slowly rotating mass of hot gases, which cooled, shrank and rotated faster. The existing planets were formed by breaking away from the central mass. The sun is one such nebula which has not yet cooled, but the earth has cooled, so that it has a solid outer crust, while the water vapour condensed to form oceans.

(b) "A Nor" Wester is a type of *squall*, usually accompanied by violent thunderstorms and heavy rains and hail and showers, experienced during the hot season (April to June). At this season the rainfall of Bengal, Assam and Burmah is largely derived from these nor'-westers, and in Assam they are extremely important to the tea crop."

(c) The Mediterranean is more saline than the Atlantic, because the Mediterranean has a small rainfall, great evaporation, and small number of inflowing rivers. The Black Sea is comparatively fresher than the Red Sea, because it receives many large rivers, and also has heavy falls of rain and snow and small evaporation, while the Red Sea receives no large rivers (which are generally fresh), has great evaporation and low rainfall.

(d) An alluvium is the surplus rock material consisting of sand, silt and gravel which a river carries in suspension.

It is mostly deposited near the deltas or where the river water becomes stagnant.

(e) Anthracite is hard, shiny, black coal, which contains the lowest proportion of water and volatile matter and the highest fixed carbon content. Bituminous coal is black shiny coal, whose carbon content is midway between anthracite and lignite, the last one having the lowest content of carbon in it.

(f) The position of the earth in its Orbit when it is at its greatest distance from the sun is called the aphelion. It reaches this position during the northern summer, when the days are of maximum length.

(g) The study of the geographical distribution of plants and animals is called *Biogeography*.

(h) The fertile volcanic soil of north-west Deccan where cotton is largely cultivated is called the *Black-Cotton-Earth*. The characteristic of this earth is that it retains moisture for long after the rains have ceased and this keeps the cotton plant supplied with moisture to its roots and enables a good growth.

(i) This is the type of climate experienced in the interior of great land masses, specially in the northern hemisphere. This is a climate characterized by extremes of temperature, with maxima and minima occurring soon after the summer and winter solstices respectively. Great ranges of temperatures are experienced, both diurnally and seasonally; there is relatively low rainfall and low humidities.

Q. 138. What are the following and where do you find them most ?

(i) **Coniferous Forest.**

(ii) **Deciduous Forest.**

(iii) **Tropical Rain Forest.**

Ans. (i) Forests of evergreen cone-bearing trees carrying needle-shaped leaves are called coniferous forests. They are mostly found in northern Canada and northern Eurasia, with 'tongues' of forests extending southward on the Rocky Mountains, in the Alps and other high mountains.

(ii) Forests, whose trees lose their leaves at some season of the year are called deciduous forests. Such trees are found both in Monsoon types of climates as well as in temperate regions. In monsoon regions of India and Burma, for example, they lose their leaves at the approach of summer to protect themselves from the severe loss of water during the hot dry summer, while in temperate regions they shed their leaves on the approach of winter to protect themselves from its cold and frost.

(iii) Evergreen forests of the hot and moist tropical regions round about the equator are the hot tropical rain forests. There are such type of vast forests in the basin of the Amazon and the Congo rivers, in the East Indies, Burma and parts of India.

Q. 139. Answer the following :—

- (a) What are the measurements of (i) broad (ii) standard
(iii) narrow gauges of railway tracks ?
(b) Of what length is a geographical mile ?

(c) What is a Geyser ? Name some of the most well known geysers of the world,

(d) Where is Rift Valley ?

(e) Where and in which countries do you find ?

(i) The Savanas

(viii) Velds

(ii) Llanos

(ix) The Rand

(iii) Steppes

(x) Alpaca

(iv) Praries

(xi) Zebra

(v) Pampas

(xii) Simoom

(vi) Tundras

(xiii) Siroco

(vii) Loches or Fiords

(f) How can you find the longitude of a place ?

(g) Which people are called the Negritos ?

(h) What are the advantages of rotation of crops ?

(i) What is the Thermal Equator ?

(j) Which places are called the White Man's grave ? Why ?

Ans. (a) Broad gauge railway tracks are those which have a width of 5 ft. or more ; the standard gauge is 4 ft. 8½ inch wide ; while the narrow gauges include the metre gauge, which is 3 ft. 6 inches and smaller gauges.

(b) A measure of length equal to one-sixtieth of a degree or one minute (1°) of latitude is a geographical mile. It is approximately 6080 ft.

(c) A hot water spring which throws continuously or at short intervals a jet of hot water or steam is a geyser. The Yellow-stone National Park, Wyoming U.S.A. ; the Mt. Hekla in Iceland, and Waimauku of New Zealand are examples.

(d) The great valley which extends through Syria, Palestine and East Africa, over 3000 miles in length. It includes the Sea of Galilee, the Valley of River Jordon, the Dead Sea, and runs right upto Lake Nyasa.

(e) (i) Savannah in Georgia, U.S.A., near the mouth of the Savannah river.

(ii) Llanos in the Orinoco basin and the Guinea highlands, situated north of the equatorial forests of the Amazon basin in South America.

(iii) Steppes in southern European U.S.S.R. and south-west Siberia.

(iv) Prairies in North America covering most of the region between the Rockies on the west and the Great Lake and Ohio in the east and extending into Canada.

- (v) Pampas in Argentina between Andes and the coast.
- (vi) Tundras in north Russia.
- (vii) Loches or Fiords. The former in Scotland and the latter on the coasts of Norway and Greenland.
- (viii) The Transvaal in South Africa.
- (ix) The Rand in South Africa, specially the Witwaters rand in the southern Transvaal.
- (x) Alpaca in Chile, Peru and Bolivia.
- (xi) Zebra in the plains north of the Orange river and Abyssinia and Somaliland in Africa.
- (xii) Simoom in the Sahara and the Arabian deserts.

(xiii) Siroco in North Africa, Sicily and southern Italy.

(f) The longitude of a place may be found from the difference between Local Time and Greenwich Mean Time as shown by chronometers.

(g) The dwarfish negro-like people of the Philippines islands are called Negritoës. This term is also applied to the negro races of small stature found in Africa, Malanesia and parts of the Indonesian Republic.

(h) Among the advantages of rotation are (1) The more effective control of weeds, pests and diseases (2) The more economical use of soil food.

(i) *Thermal Equator*. The imaginary line drawn round the globe through places which have the highest mean temperature for any particular period.

(j) Lands along the Guinea Coast of West Africa are called the White Man's Grave. These include the Gold Coast, Ivory Coast and Nigeria. The atmosphere is perpetually so hot, and humid and unhealthy that it is difficult for a white man to live long in these countries.

Q. 140. What is ? :—

(a) **Declination of the Sun**

(d) **A Fault**

(b) **Dry-Farming**

(e) **A sidereal day**

(c) **An Equinox**

(f) **A Salactite and a Stalagmite**

Ans. (a) The angular distance of the sun either north or south of the equator is called Declination of the Sun.

(b) This is a method of farming without irrigation in an area of limited rainfall. The land is treated so as to conserve the moisture it contains. In this method special care is taken to remove all weeds that would take up some of the moisture, and a mulsh (loose material, straw, dung etc.) is prepared to resist capillary action and protect the moisture in the soil from the heat

of the sun. The plough is also repeatedly used to get a powdery surface soil which protects the moisture below its surface.

(c) The time of the year when the sun appears vertically overhead at the equator.

(d) A fault is an interruption in certain strata of rocks or a fracture of the strata due to continuous strain in the crust of the earth.

(e) "The Sidereal Day" is the period of time during which a star describes a complete circle in its apparent journey round the Pole Star, representing the period of rotation of the earth on its axis. It is equal to 23 hours, 56 minutes and 4 seconds.

(f) Stalactite is a limestone formation, usually like an icicle found mostly in limestone caves. Water dripping from the roof leaves behind a minute coating of calcium carbonate. Such accumulations over long period build up a pendant. This pendant is a stalactite.

A stalagmite is that which accumulates on the floor, just as the stalactite is the hanging from the roof.

Q. 141. Answer the following :—

(a) Where in India would you find (i) The Lion (ii) The Cheetah (iii) The Rhinoceros (iv) The Antelope (v) The Bison (vi) The Wild Ass.

(b) Which of these Indian rivers fall in the Bay of Bengal and which in the Arabian Sea? The Mahanadi, Narmada, Krishna, Godavari, Tapi and Cauvery.

(c) What is the average height of the Eastern and Western ghats? What is the maximum height of any of their peaks?

(d) Where are the Nilgiri Hills? Of what mountain ranges are they a part? Where are the Lushai Hills, the Satpura range and the Garo hills?

(e) Which states of India grow most : (1) Groundnut (2) Rape and mustard (3) Linseed (4) Sesamum (5) Castor (6) Virginia Tobacco (7) Rice (8) Cotton.

(f) What are the most important sources of vegetable oils grown in India?

(g) By the Radcliffe award, which portions of the Punjab and Bengal went to Pakistan and which remained with India?

(h) Which flies the fastest among the following? What is the approximately maximum speed of each of them? :—

Ostrich, Emu, Frigate-bird, the duck-hawk, the swift, the Golden eagle, swallow, vulture, a racing pigeon, ducks and geese, the owl and cuckoo.

(i) Which of these four legged animals runs the fastest and what is approximately the maximum speed of each ?

A race horse, blak buck, hare, gray-hound, antelope, cheetah, fox, rabbit giraffe, camel, wild boar.

Ans. (a) (i) The Lion in the Gir forest in Junagarh in Saurashtra ; (ii) The Cheetah in the Deccan ; (iii) The Rhinoceros in the Brahmaputra valley and the Sundarbans ; (iv) The Antelope mostly in Gujerat and Orissa (v) the Bison in the hill jungles of Assam and Madhya Pradesh (vi) The Wild Ass in the deserts of Kutch.

(b) The Mahanadi, Krishna, Godavari, and Cauvery fall in the Bay of Bengal, while the Nerbada and Tapti in the Arabian Sea.

(c) The average height of the Western Ghats is about 3,000 ft. while that of the Eastern Ghat is 1,500 ft. The maximum height to which their peaks rise is 9,000 ft.

(d) The Nilgiris are in the Deccan. They are a part of the inner triangular plateau which the Western and Eastern Ghats form far in the southern parts of the Deccan.

The Lushai and Garo hills are in Assam. The Satpura ranges are in the central belt of India dividing the Deccan plateau from Northern India.

(e) (1) Groundnut is grown mostly in Madras, followed by Bombay and Andhra States (2) Rape and mustard in Uttar Pradesh, Bihar, Punjab and Assam (3) Linseed in Bihar, Uttar Pradesh, Madhya Pradesh and Andhra. (4) Sesamum is grown in practically the whole of India, but mostly in the Deccan (5) Castor grows almost throughout the length and breadth of the country (6) Virginia tobacco in the Guntur District of Madras (7) Rice mostly in W. Bengal, Bihar, Madras, Orissa, Madhya Pradesh, Uttar Pradesh, Assam and Bombay (8) Cotton mostly in Bombay State, Uttar Pradesh, Punjab, Madras, Andhra and Madhya Pradesh.

(f) The most important sources of vegetable oils grown in India are : cocoanut, niger, safflower, cotton seeds, castor, sesamum (til), linseed, rape and mustard, groundnut and mohwa seeds.

(g) The parts of the Punjab that went to Pakistan are : The whole of the Multan and Rawalpindi Divisions, the Districts of Sheikhupura, Sialkot and Gujranwala of the old Lahore Division and some portions of the Gurdaspur and Lahore Districts of the old Lahore Division ; while the Ambala and Jullundur Division the whole of Amritsar District of Lahore Division and parts of Gurdaspur and Lahore Districts of the old Lahore Division remained with India and now form part of East Punjab.

In Bengal the entire Dacca and Chittagong Divisions, as also the districts of Pabna, Khulna, Rajshahi, Bogra and Rangpur, and the major part of Sylhet district went to East Bengal, while the remaining, that is, the whole of the Burdwan Division, and the districts of Calcutta, Murshidabad, Darjeeling and 24 Parganas, as also parts of the districts of Nadia, Jalpaiguri, Malda, Jessore and Dinajpur remained with India; the remaining parts of these last five mentioned districts went to East Pakistan.

(h) The frigate-bird has the fastest speed, reaching upto 260 m.p.h.; the next fastest is the swift, which has been known to fly at a non-stop speed of 220 m.p.h.; the next comes the duck hawk whose recorded speed came to 200 m.p.h.: the golden eagle reaches upto 120 m.p.h.; the vulture reaches a speed of 110 m.p.h.; the swallow about 105; a racing pigeon to about 95 m.p.h.; ducks and geese from 60 to 70 m.p.h.; the owl and the emu are known to have attained speed upto 40 m.p.h.: the ostrich to 30 m.p.h.; the cuckoo to about 25 m.p.h.

(i) Among animals the fastest is the cheetah which can reach upto 70 m.p.h.; the black buck and the antelope to about 50 m.p.h.; next to these come the fox and the hare which reaches upto 45 m.p.h. when running for life; a greyhound to about the same speed though only for a few minutes; the rabbit comes close next to 35-38 m.p.h.; the race horse reaches upto 36 m.p.h. the giraffe can run to 32 m.p.h.; the wild boar upto 30 m.p.h. and the camel can come upto 25 m.p.h.

POLITICS

QUESTIONS SET ON POLITICS IN VARIOUS COMPETITIVE EXAMINATIONS

Q. 1. State briefly the methods by which the Constitution of India can be amended. (Your answer should be in about 10 lines).

(Indian Administrative Services Exam. 1958).

Ans. An amendment of the Constitution may be initiated by the introduction of a Bill for that purpose in either House of Parliament and when the Bill is passed in each House by a majority of the total membership of that House and by a majority of not less than two-thirds of the members of that House present and voting, it is to be presented to the President for his assent. When that assent has been given by the President, the Constitution then stands amended in accordance with the terms of the Bill.

Q. 2. Discuss the significance of Sarvodaya and Bhoodan in the context of Gandhian philosophy. (Your answer should be in about 29 lines.)

(Indian Administrative Services Exam. 1958.)

Ans. The Bhoodan and Sarvodaya movements are based on the Gandhian philosophy of change of heart. These movements do not compel ; but simply persuade. Those who possess surplus land are persuaded to part with that surplus by an appeal to their sense of justice and their elementary duty to society. "Bhoodan", in the words of Shri Narain is in short the Gandhian way to bring about an economic and social revolution. Bhoodan is the theory and practice of a new way of life that Gandhiji preached. According to Gandhiji man is not the absolute master of what he possesses, but is only a trustee of what in reality belongs to the society. He is thus a trustee who should take from the trust no more than what is necessary to fulfil his needs and give all the rest back to society. It is in this context that the movement has been started and Vinoba goes about from village to village to ask for the free gift of land by landlords that their surplus lands may be distributed among the landless which is being done.

Similarly in Sarvodaya, the workers who believe in the Gandhian ideal of truth and non-violence and selfless service of humanity, dedicate themselves to khadi, harijan uplift, service of the Adibasis, leprosy relief work and promotion of communal harmony which were all so dear to Gandhiji.

Q. 3. Write short notes (about 7 lines on each) on any three of the following :

- (a) Summit Conference
- (b) United Arab Republic
- (c) Developments in Algeria
- (d) Execution of Imre Nagy
- (e) Foreign Exchange crises in India
- (f) Dock labour strike in India in June 1958.

(Indian Administrative Services Exam. 1958)

Ans. (a) Summit Conference. Mr. Khrushchev sent a number of letters during the middle of 1958 to Mr. Eisenhower, President of the U.S.A. and to the Prime Ministers of the U.K. and France proposing a 'Summit Conference', i.e., the Conference of the Heads of Government for resolving the disarmament deadlock and to thrash out a commonly agreed policy with respect to the Middle East so as to avert any clash of arms over that area, specially as civil war had broken out in the Lebanon, and the U.S.A. sent its marines to help the government of that country against the insurgents, while the U.K. sent its troops to Jordan. That conference never took place, for the U.S. and U.K. knew there would be no agreement over this part of the world, as well as over disarmament, as the views of the two sides are diametrically opposed to each other. Such a conference took place at Geneva, but not much came of it.

(b) The United Arab Republic. This is a Union between the Republics of Egypt and Syria brought about on Feb. 1, 1958. Both these countries have always had in recent years a neutralist policy like that of India and they thought it better to unite as one strong nation. They have now one flag and one president. This is a great event in Arab history, for it means the giving up by Arab people their old habit of engaging in local feuds which made them easy victims first of the Turks and next of the Europeans. Now they will stand as one people against their common foe, Israel, in any clash of arms between the two.

(c) Developments in Algeria. For a number of years now there has been going on a bitter war of liberation between the nationalist native Muslim Algerians, on the one hand and the French occupation forces and the French settlers, called the Colons, on the other hand. Similar liberation struggles in Morocco and Tunisia ended in the grant of independence to both these countries, but the problem in Algeria is quite difficult of solution because there is a large population of French settlers there, who having lived as a master race, would not now submit to the rule of the Nationalist Algerians, their bitterest foes. General de Gaulle has tried to solve this problem by making Algeria a province of Metropolitan France, and offering Algerian Muslims an equal

status with all Frenchmen. It is to be seen how far this scheme will be successful.

(d) **Execution of Imre Nagy.** Imre Nagy became the Prime Minister of Hungary when after a great national uprising against the oppressive rule of the native Roski government, Mr. Roski the premer was thrown out. Mr. Nagy implored the insurgents to lay down their arms, promising a coalition government of all "democratic parties" chosen on western style of elections and ending of 9 years of absolute Communist rule and a promise was made to include non-Communist parties. Also, he announced to call on the Soviet Commander to withdraw Soviet troops from Hungary. This move was resented by the Russians who decided to overthrow and arrest him. Mr. Nagy got a clue of this and took asylum in Yugoslav Embassy. Soon he decided to leave it but was arrested and kept in an unknown prison, till his execution was announced.

(e) **Foreign Exchange crises in India.** We are having an acute shortage of foreign exchange, because we are having far heavier imports over exports. This is due to large purchases of heavy and light machinery from abroad for the carrying out of the Second Five-Year Plan and the development of heavy industry, as also for purchase of large stocks of food from abroad. The result has been that the Government has been obliged to ban the import of a vast varieties of goods, which are not essential to national development and requirement of the consumers. O.G.L. (the Open General Licence) has been cancelled and imports have been severely restricted to the import of only those commodities which are regarded as essential to national security and development of heavy industries. Import of almost all consumer goods has been banned.

(f) **Dock labour strike in India in June.** The port and dock workers' strike began on the midnight of June 15 at India's major ports. It was the first all-India strike.

In its dispute with the Government labour insisted that their demand for certain benefits like provident fund and gratuity should be settled within four days. In case of absence of agreement, the matter should be referred to an arbitration committee composed of equal members of labour and port authorities; the chairman of this committees should have the confidence of both parties. The Government's desire to avoid the strike was apparent by their conciliatory approach to negotiations. The Government's difficulty was however ignored by the workers. Three of the six ports are administered directly by Government. If the Government grants concessions to dock workers, it meant trouble in Government's other departments. The Government wanted to wait for the report of Second Pay Commission. However the Government made a compromise with it and ultimately it ended, after an

assurance was given to labour that a commission of inquiry would be set up and labour's demands would be met in compliance with the recommendation of the commission.

Q. 4. (a) What are the names of the two Chambers of the Indian Parliament ?

(b) How are the members thereof selected ? (Your answer should be in about 12 lines.)

(National Defence Academy Exam. June 1958)

Ans. (a) The Upper Chamber or Upper House of the Parliament is called Rajya Sabha. The Lower Chamber or Lower House of the Parliament is called Lok Sabha.

(b) Members of the Lok Sabha are chosen directly by the people of India, on the basis of adult suffrage, that is to say, every person who is a citizen of India and who is not less than twenty-one years of age on such date as is fixed by or under any law of the Union Parliament and is not otherwise disqualified under the Indian Constitution on the ground of non-residence, unsoundness of mind or corrupt or illegal practice is entitled to be registered as a voter and can vote for a candidate of his choice for the Lok Sabha.

No disqualification like possessing of property, income, status, titles or literacy etc., is required.

The members of the Rajya Sabha are chosen indirectly. They are not elected by the people directly but are elected members of the different states of India and these elections are held according to the system of Proportional Representation (states choose members according to their population) by means of the single transferable vote.

Q. 5. Write brief notes on the following (not more than four or five lines on each) :—

(a) The Supreme Court of India.

(b) The Speaker of the Lower House of the Indian Parliament.

(c) The Government of a State (Pradesh) in India.

(d) Republic Day (in India).

(National Defence Academy Exam. June 1958)

Ans. (a) The Supreme Court of India. The Supreme Court of India stands at the head of all the High Courts and Lower Courts of India. Normally it consists of a Chief Justice and seven other judges, though by an Act of Parliament there can be a maximum of ten judges, excluding the Chief Justice.

This court is a final interpreter of the Constitution and a

final court of civil appeal. In criminal matters, it is empowered with criminal appellate jurisdiction in certain specified cases.

It can also deliver judgement in disputes arising either between a State and the Government of India or between States.

(b) **Speaker of the Lok Sabha.** He is the member who is elected by the Lok Sabha at every election to preside over its deliberations. He has a casting vote in case of a tie, but does not take parts in debates or vote as an ordinary member. He acts impartially towards all parties in the Lok Sabha, for as soon as he is chosen he ceases to be member of his party. He gives ruling on any point of dispute which is final. He keeps records of the proceedings in the Lok Sabha.

(c) **The Government of a State in India.** The government of a State consists of a Governor, appointed by the President of the Indian Union, the Chief Minister and his Cabinet who are in-charge of various departments of the government, including police who keep peace in the State. Like the Central Parliament, every state has a Legislative Assembly which makes laws for the State.

The various departments under the ministers have an hierarchy of officials who run the day-to-day administration of the State and are responsible to the minister-in-charge of a department.

(d) **Republic Day.** This day falls on 26th of January of each year, for on that day we had pledged to carry on the struggle for independence till we won our independence from the British and our country became a full-fledged dominion of the British Empire. On that day we declared Bharat a republic. That day is a holiday throughout the length and breadth of the country, and is celebrated with fireworks and illumination of government buildings. Prominent shops also take part in this illumination. Leaders deliver speeches and remind us to remain united and keep our hard-won liberty. In Delhi the government of India arranges a big military parade and procession of the President of India is taken out in New Delhi.

Q. 6. Quote in not more than eight lines, the text of the assurance given to the citizens in the Preamble to the Constitution of India.

(Military College Exam. May 1958).

Ans. The assurances given to citizens in the Preamble to the Constitution of India are:—

To secure to all its citizens

Justice, Social, Economic, and Political ; Liberty of Thought, Expression, Belief, Faith and Worship ;

Equality of status and of opportunity and to promote among them all

Fraternity, assuring the Dignity of the Individual and the Unity of the Nation.

Q. 7. State, in not more than six lines, what you understand by the following expressions. Give one current instance of each.

(a) Cold War ; (b) Guerilla War ; (c) Political Sabotage.
(Military College Exam. May 1959)

Ans. (a) Cold War. This is the popular name for the strained relations after World War II between the Western Powers and the U. S. A., on the one hand, and the U. S. S. R. on the other. One well known example may be cited : The blockade by U. S. S. R. between the E and W Zones of Berlin after repeated failure of the Council of Foreign Ministers on the future of Germany. Whenever there is a great mud slinging at each other on big political issues, it is described as a cold war.

(b) Guerilla war. This is a type of warfare, in which bands of armed irregular troops take part. They harass the enemy's regular troops, cut off or carry off his supplies and never fight a pitched battle. They thus assist the regular army in defeating the enemy. The Marhatta bands under Shivaji adopted these guerilla tactics against the Mughal armies which were superior both in equipment and numbers.

(c) Political sabotage. This term is applied for actions for political purposes taken against an enemy to undermine his morale and bring about his downfall without open fighting. In World War II people in countries under Nazi rule did all they could to hinder the Germans and many acts of sabotage were committed, such as derailing troop trains, blowing munition factories etc. This is quite distinct from the method of retarding industry by smashing machinery, buildings or otherwise preventing progress by a factory's workers. Trying to defame and lower the prestige and morale of a government or a man in high position may also be called political sabotage, the purposes of which is to bring about their downfall.

Q. 8. What did Mahatma Gandhi mean by *Poorna Swaraj* ? What effect did his life and preachings have on the Constitution and foreign policy of India ?

(Your answer should be in about 25 lines).

(Indian Administrative Service Examination 1957)

Ans. By *Poorna Swaraj*, Mahatma Gandhi meant that India was to win complete independence from the British. She was to evolve her own independent foreign and internal policy, she was to have her army, headed by Indian Officers, so also her navy and

air force. She was to be the master of her house in every way. The British must leave India so that it be governed by the sons of the soil and though he did not wish to sever all connections with the British, but he did not want India to be governed by the Secretary of State, even though he be an Indian. Thus *Poorna Swaraj* was taken to imply "self-rule within the Empire, if possible, without, if necessary."

The foreign policy we have evolved since independence, viz., that we are not to align ourselves with any power block, but we must be friends to all, is based on his conception of what our relations with the outside world shall be. He was against the British system of government in India, but he was no enemy of the British people as such. He denounced the British government in India but praised the British people. He had many friends among the English. Similarly though we are not communists we are friends of all the communist countries. We are friends also of the West, though we denounce their colonial mentality and their tactics. The seeds of and direction to this policy were thus laid by Gandhiji.

The directive principles in our Constitution, as well as emphasis on the obliteration of distinctions in caste, creed and colour were contributions of Mahatma Gandhi to our Constitution.

Q. 9. (a) In what ways, if any, do the results of the Second General Election differ from those of the previous one ?

(Your answer should be in about 10 lines.)

(b) What do you think of the criticism that the Congress Government failed in their duty to foster a strong opposition in the country ?

(Your answer should be in about 10 lines).

(Indian Administrative Service Examination 1957)

Ans. (a) 1. In the first General Elections the Congress was able to form ministries in all the states without exception. In the Second General Election the Communist Party threw it overboard in Kerala.

2. As compared with the figures for the first general election, a large percentage of a larger electorate has, however, voted Congress this time. Thus in the Lok Sabha its votes polled have gone up from 45 per cent to 47 per cent, while in the Vidhan Sabha from 42 per cent to 45 per cent. There was an increase of 18.3 million in total votes polled in the second election, and the Congress secured 11.1 million additional votes.

3. The Praja Socialist Party was in the second election simply routed.

4. The Jan Sangh did little better, though it polled this time more votes as well as a higher percentage of votes.

(b) It is no duty of the Congress or of a party in power in the country to create and foster an opposition, though if it happens to be strong and stable, that can exchange places in the succeeding elections it is so much the better for the country, lest one party getting power drunk ride rough shod over others as the Congress has often done. But an opposition to be strong must have leaders that command respect and a large following and have clear cut programmes which they can put before the country. Now except the Congress, no opposition party has any leader of outstanding ability and the stature of Jawaharlal Nehru. The Jan. Sangh has only local leaders. The Communists could win in Kerala because the Congress got thoroughly discredited in that state, otherwise it has no great leader, while its ideology is abhorrent to the Indian masses. The P. S. P. has only Kriplani to count but he is not an all India leader. He always appears to be on the verge of retirement. There is no other party worth the name. So it is no fault of the Congress that there is no effective opposition in the country.

Q. 10. Write short notes of about five line each on the following :—

- (a) Baghdad Pact.
- (b) Zonal Councils.
- (c) Republic Day celebrations.

(Indian Administrative Service Exam. 1957)

Ans. (a) The Baghdad Pact. This is a defensive military pact made in 1955, to which Great Britain, Iran, Iraq (now out of the pact), Turkey and Pakistan are signatories. It is actually made as a deterrent to any aggression from the Communist block of nations. The real force at the back is that of the U.S.A. which is on its military committee.

(b) Zonal Councils. India has been divided into five zones, northern, central, western, eastern and southern. In each zone there are a number of states situated close to each other. Thus the northern zone comprises the states of Jammu and Kashmir, Punjab, Rajasthan and the Union territories of Delhi and Himachal Pradesh. In each zone there have been set up advisory councils whose function is to promote active co-operation among the states in economic and other fields. Thus they will take up problems of inter-trade, border tolls, sales taxes, facilities for technical and other forms of education, exchange of technical and administrative personnel etc.

(c) Republic Day Celebrations. These are enthusiastic though quite dignified celebrations in Delhi and States on 26th January of each year, when we took a vow that day on the banks of river Ravi to achieve *Purn Swaraj* (complete independence) for our country from the British yoke. On that day—to describe the celebrations in the capital—tanks rumble past the President, followed by many contingents of the army, navy and air force, in

uniforms. Jet fighters whistle overhead, while the country's cultural heritage as well as the present stirrings of life with the theme of unity are represented by a colourful pageant. At night there is illumination throughout the city and on government buildings. Hundred and thousands people throng in streets to witness them.

Q 11. Enumerate in not more than five lines each the following :—

(a) The five principles of international relationship known as the "Panch Shila"

(b) Any five world organizations connected with the U.N.O.

(c) The five demands made by Pakistan in connection with its dispute with India over the State of Jammu and Kashmir when the question was discussed in January last in the Security Council of the U. N. O. (Military College Exam. 1957)

Ans. (a) (i) That each nation should respect the territorial integrity of the others.

(ii) That no one shall have aggressive designs on the others.

(iii) That none shall interfere in the internal affairs of others.

(iv) That each one should try to benefit the others.

(v) Each one will exist perfectly at peace with the others.

(b) (1) United Nations' Educational, Scientific and Cultural Organization (U.N.E.S.C.O.)

(2) United Nations' Relief and Rehabilitation Administration (U.N. R.R.A.)

(3) United Nations' Food and Agricultural Organization (founded in 1945).

(4) World Health Organization of the U. N. O. (founded in 1946).

(5) International Bank for Reconstruction and Development (founded in 1945).

(c) The five demands of Pakistan were—

(i) That India, along with Pakistan, should withdraw her forces from the Jammu and Kashmir State and thus demilitarization of the State should take place preliminary to the holding of a plebiscite.

(ii) That there should be held in this State a plebiscite to know the will of the people as to whether they want to join India or Pakistan.

(iii) That this should be done under the supervision of the U.N. and that there should be stationed a United Nations force in the State to supervise the plebiscite.

(iv) That a time limit be fixed by which the plebiscite must take place.

(v) That the Security Council should, when calling upon the parties to withdraw all their troops from the State of Jammu and Kashmir also ensure that the local forces are placed under the Security Council and are suitably reduced if not disbanded altogether.

Q. 12. Write factual notes on four of the following :—
(Four to five lines for each)

- (a) The general political picture of India as a result of the general election.
- (b) The mission of Gunnar Jarring.
- (c) Panch Shila.
- (d) Broad difference between the First Five Year Plan and the Second.
- (e) Independence of Ghana.

National Defence Academy Exam. 1957)

Ans. [Note. For answering the types of questions set here, consult the latest and back editions of India and the World magazines published by M/s Malhotra Brothers, 1, Faiz Bazar Delhi].

(a) Read answer to Q. 9.

(b) Mr. Gunnar Jarring, who was President of the Security Council in Feb. 1957 was chosen by the U.N. to make a report on the Kashmir issue. He visited the Indian sub-continent in April, 1957. After meeting high officials both in Pakistan and India. Mr. Jarring issued a report which *inter alia* stated : 1 If a plebiscite was held there were great problems that might arise out of it. 2. There were changed political, economic and strategic factors surrounding the whole of the Kashmir question and these must be taken into consideration.

(c) The Panch Shila are the five great principles that should govern the conduct of different countries as first announced in a joint communique by Mr. Chou-en-Lai, Prime Minister of China and Pt. Nehru on the occasion of the visit of the former to India. (1) Each country should respect the territorial integrity of the other. (2) None should have aggressive designs on each other. (3) No country should interfere in the internal affairs of another. (4) They should try to benefit each other. (5) They must peacefully exist side by side.

(d) In the First Five-Year Plan the greatest emphasis was laid on agricultural production, specially in an effort at food self-sufficiency. For this purpose great multiple purpose dam projects were started. There was also given a fillip to the production of non-food crops like cotton, sugar-cane, jute and oilseeds to keep our mills going. In the Second Five-Year Plan greater emphasis has been given to the production of heavy machinery, specially in the Public sector, to industry in general and to India's great transport industry like the Railways, though, agriculture, our basic industry has not been neglected.

(e) Ghana, formerly called the Gold Coast, a country on the west coast of Africa and inhabited by the Negroes, got its independence from the British in March, 1957. Thus one more independent African Nation has been born. The first Prime Minister of this country is Mr. Nkrumah.

POLITICS

POLITICS

Q. 1. Explain what you mean by Adult Franchise. Are there any restrictions on the exercise of the Franchise in the Constitution of Bharat? If there are some, of what nature are they?

Ans. The right to vote for electing members to the parliament of a country, granted to every adult citizen, male or female, by the constitution of that country, without distinction of caste, colour or creed and without any restricting clauses as to the possession of education or property or some special qualification is Adult Franchise. The Constitution of Bharat has granted this right to its citizens to the fullest extent. Only the mentally insane or those charged with corrupt or illegal practices or crimes or those who are disqualified for such reasons as being aliens in the country shall be debarred from the exercise of this right, otherwise every one has the right to be registered as a voter for any such election.

Q. 2. Give, in the space provided, the salient features of the draft Constitution of India.

Ans. The following are the salient features of the Draft Constitution of India, that is, Bharat :

1. That the country was to have a democratic type of government with a President as the head of its executive, a parliamentary type of government, whose members were to be chosen by votes on the basis of adult franchise, and who were to be responsible for all their acts to the elected parliament.

2. The Draft Constitution embodied a comprehensive list of rights and guaranteed them to the citizens by making them justiciable.

3. The Draft Constitution provided for a Union of States, whose sphere of authority, as well as that of the Centre, was clearly defined.

4. Although the Draft Constitution made the country a Union in structure, it provided for a single instead of dual citizenship.

5. The Draft Constitution provided for a strong Centre by giving to the National Parliament the exclusive right to legislate on a number of matters and by vesting residuary powers in the Centre.

6. A unique feature of the Draft Constitution was the provision that in an emergency the State could be changed into a unitary state by a proclamation to that effect by the Union President.

7. The Draft Constitution avoided the usual rigidity and legality of most federal types of constitutions by providing for easy and safe methods of amendment to the Constitution.

8. It provided for an independent judiciary and clothed it with sufficient power to act as the guardian of the Constitution and to discharge its duties independent of the favours of the executive.

9. A clear provision was made in the Draft Constitution itself that the State language will ultimately be Hindi, in the Devanagari script, with the Indian numerals in the international form.

Q. 3. Describe the National Flag of India and the State Emblem of the Government of India.

Ans. The national flag of India is divided into three parts, one after the other, viz., Saffron, white and dark green, all horizontal. The Asoka wheel of 24 spokes in navy blue is in the centre of both sides of the white band. The saffron is on the top, white in the middle and dark green at the bottom. The wheel is an exact reproduction of the wheel (or dharma chakra) on the capitol of the Asoka pillar at Sarnath. On the flag it is as wide as the white band. The National Emblem of India is the replica of the capitol of the Asoka pillar at Sarnath. It is formed of three lions mounted on an abacus with the Dharma Chakra carved in relief on this abacus. There is also an outline of the Dharma Chakra both on the extreme right and left. Below the Emblem are inscribed in Devanagari the words "Satyameva Jayate" (Truth alone triumphs) taken from a famous verse in the Mundaka Upanishad.

Q. 4. What are the salient features of the Constitution of Bharat? State in one paragraph containing not more than 15 lines.

Ans. Please consult answer to Q. 2. The main features are practically the same, except for some minor modifications in details which may be ignored.

Q. 5. What types of qualifications must the person who offers himself as a candidate for the Presidential gaddi of Bharat possess to be accepted for that august post?

Ans. Qualifications of a President. The Constitution lays down that

1. No person shall be eligible for election as President unless he

(a) is a citizen of India,

(b) has completed the age of thirty-five years,

(c) is qualified for election as a member of the House of the People.

2. A person shall not be eligible for election as President if he holds any office of profit under the Government of India, or the Government of any State or under any local or other authority subject to the control of any of the said Governments.

Q. 6. Mention in brief the powers of the President of the Republic of Bharat. Wherein do they differ from those of the President of the U.S.A. and the English King ?

Ans. Powers of the President. All the executive powers of the Union are formally vested in the President including the supreme command of the forces. Under the Constitution, he is the head of the State, but not of the Executive, and in this respect is more like the British king who is the Constitutional Head of the Government than the President of the U.S.A. The President of the U.S.A. combines in himself the functions of head of the State and Prime Minister. He appoints his own Cabinet which is responsible only to him and not to Congress. The Indian President chooses as his Prime Minister the leader of the majority party in Parliament and the Prime Minister is responsible for all his acts to Parliament and not to the President. The President of the U.S.A. directs and supervises the executive departments, but according to the Indian Constitution, this is the function of the Prime Minister and his Cabinet. However, the Indian President must be consulted on all important matters of State policy, but the English Monarch is only a cipher even in this respect. He has the prerogative of being only informed about all important matters and important legislations that are going to be passed in the House of Commons.

Like the President of the U.S.A. the Indian President has the right to send messages to the House of the People about the State policy, but unlike the U.S. President the control of foreign relations vests in the Indian Prime Minister only. In majority of other powers the Presidents of both the countries are at par.

Though the Indian President is hedged in by so many restrictions his powers are still vast and varied : Thus

1. All important appointments are made by him, including those of the Governors, Judges of the Supreme and High Courts, diplomats, the chairman and members of the Federal Public Service Commission as well as the Comptroller and Auditor-General of India. It is he who appoints the Election and Finance Commissions and other Commissions which report to him on the administration of the scheduled areas and socially and educationally backward areas.

The President is vested with the ultimate power to grant pardon, to remit punishment and commute sentences passed in the courts of India.

In times of emergency and during the recess of Parliament he can issue ordinances and assume the control of the country in his person. He is also the person who dissolves the House of the People and as already mentioned sends messages to it for consideration.

Finally, no money can be granted or Money Bill introduced in Parliament unless it has the assent of the President.

Q. 7. How is the Governor of an Indian State appointed ? What powers can he exercise at his discretion and what are the restrictions imposed upon his arbitrary use of these powers ?

Ans. The Governor of a State is appointed by the President by warrant under his hand and seal.

In his State, the Governor has been granted exercise of almost the same powers that the constitutional head of the Union possesses. Thus the Governor of a State shall have (1) the power to grant pardons, reprieves, respites or remissions of punishment or to suspend, remit or commute the sentence of any person convicted of any offence against any law relating to a matter to which the executive power of the State extends. (2) Like the President, the Governor has the right to send messages to the House or Houses of Legislature of his State and the House to which that message has been sent shall with all convenient despatch consider any matter required by the message to be taken into consideration. (3) No Money Bill can be passed in a State legislature unless it has the assent of the Governor. (4) The Governor has also been given the choice and power, as he thinks fit, when any occasion arises, to act in his discretion and no one shall question his right to have acted at his discretion. (5) The Advocate-General of a State, and all judges except those of the High Court of a State are to be appointed by the governor after consulting the Chief Justice of the State, and can make other minor appointments.

As the Governor of a State holds office during the pleasure of the President, the Centre has full control over all the activities of the Governor. The Governor has also to act only as the constitutional head of a State. All important ordinances that a Governor promulgates under some exceptional circumstances have to receive the sanction of the President, thus a Governor cannot rule his State arbitrarily by force of his ordinances.

Q. 8. Mention as concisely and lucidly as you can the conditions a person must fulfil, to acquire citizenship rights under the Constitution of India.

Ans. A person who had his domicile in the territory of India or was in the territory of India : or

either of whose parent was born in the territory of India : or

who has been ordinarily resident in the territory of India for not less than five years immediately preceding such commencement shall be a citizen of India.

All those persons who had migrated to India before 19th July 1948 or had been registered as citizens of India after that date shall also be citizens of India.

Q. 9. (A) What do you understand by Fundamental Rights ? Are there any fundamental rights that a citizen of Bharat can claim to have possessed in exercise of his rights as its citizen and guaranteed by the Constitution ? Which are they ?

(B) Which article of the Constitution guarantees to the citizens the right to move the Supreme Court through appropriate proceedings for the enforcement of the fundamental rights conferred by it ? Which article in the Constitution similarly empowers State High Courts to issue directions, orders or writs for this purpose.

(C) In pursuance of the powers conferred by this article on the Supreme Court, what sorts of directions, orders or writs can the Supreme Court issue for this purpose ?

Ans. (A) Fundamental rights are those rights which the constitution of a country confers upon its citizens and which the State is prohibited from taking away or abridging. Any law made in contravention of the clauses which confer those rights upon its citizens, is, to the extent of the contravention, to be regarded as void.

There are many such fundamental rights which the Indian Constitution confers upon its citizens. They are the following :

1. Right to Equality. The State shall not deny to any person equality before the law or the equal protection of the laws within the territory of India.

2. Prohibition of discrimination. (i) The State shall not discriminate against any citizen on grounds of religion, race, caste, sex, place of birth or any of them.

(ii) No citizen shall, on grounds only of religion, race, caste, sex, be subject to any disability, liability, or restriction with regard to access to shops, public restaurants, hotels and places of public entertainment or the use of public wells, tanks, bathing ghats, roads and places of public resort.

3. Equality of opportunity. There shall be equality of opportunity for all citizens in matters relating to employment or appointment to any office under the State.

4. Abolition of untouchability. Untouchability is abolished and its practice in any form forbidden.

5. **Right to Freedom.** All citizens shall have the right to freedom of speech and expression ; to assemble peaceably and without arms, to form associations or unions ; to move freely throughout the territory of India, to reside or settle in any part of the territory of India, to acquire, hold, or dispose of property and to practise any profession, to carry on any occupation, trade or business.

6. **Protection of life and property.** No person shall be deprived of his life or personal liberty except according to procedure established by law.

7. **Prohibition of traffic in human beings.** Traffic in human beings and 'begar' in any form is prohibited and any contravention of this provision is to be regarded as an offence punishable in accordance with law.

8. **Freedom of Conscience etc.** All persons are equally entitled to freedom of conscience and the right freely to profess, practise and propagate religion.

(B) Article 32 guarantees to citizens the right to move the Supreme Court through appropriate proceedings for the enforcement of the fundamental rights conferred by the Constitution and empowers the Court to issue directions, orders, or writs in the nature of *habeas corpus*, *mandamus*, *quo warranto* and *certiorari*, whichever may be appropriate for the enforcement of any of the fundamental rights guaranteed by the Constitution.

(C) Article 226 empowers State High Courts to issue directions, orders, or writs to any person or authority, including the Government, for the enforcement of the fundamental rights conferred by the Constitution and for any other purpose that the court may deem fit.

Q. 10. What safeguards, if any, have been provided in the Constitution of Bharat for the minorities in the Republic ?

Ans. Reservation of seats in the Indian Parliament for the scheduled classes, and for Anglo-Indians has been made for a period of ten years only from the commencement of the Constitution, as there are also some special provisions for them. They are to be abolished after the lapse of ten years. No other privilege for a minority or any permanent concession to any special class has been provided in the Constitution.

Q. 11. What do you understand by the following terms ? :—

(1) Absolutism (2) Anarchism (3) Autocracy (4) Autonomy
(5) Proletariat (6) Agent-provocateur (7) Quisling (8) Cominform.

Ans. 1. **Absolutism.** System of government in which all the power is concentrated in the hands of one or few at the top.

The governed have no representation, vote or share in the administration.

2. **Anarchism.** This term in Political theory stands for the abolition of every organised authority and State machinery and the creation of a Stateless society instead. According to anarchists every form of government is tantamount to tyranny. They, however, do not advocate a society "without order". They want to substitute government by a free association of individuals and groups based on voluntarily respected mutual treaties.

3. **Autocracy.** It is a form of government in which political power is absolute and unlimited. The Czarist Government till 1917 could be called an autocracy.

4. **Autonomy.** This term means self-government by parts of a larger whole. Thus the federal States of the U.S.A. enjoy a large amount of autonomy. The Government of India Act 1935 established provincial autonomy in the eleven Governors' provinces of India.

5. **Proletariat.** The propertyless working classes who live by the sale of their labour.

6. **Agent-provocateur.** A person set, during political or social conflicts, into the adversary's ranks to provoke, in the disguise of an adherent, compromising actions.

7. **Quisling.** A traitor co-operating with the enemies of one's country. Derived from the name of Pro-Nazi politician Vidkun Quisling of Norway who collaborated with Hitler and became puppet premier in 1942. He was shot as a traitor in 1945 and his name added to war vocabulary to describe those guilty of his brand of treason.

8. **Cominform.** Also called Communist Information Bureau, an organization of the chief European Communist parties, formed at Belgrade in October 1947, by the parties of the U.S.S.R., Bulgaria, Czechoslovakia, France, Hungary, Italy, Poland, Rumania and Yugoslavia to co-ordinate the activities of the Communist Parties on the basis of mutual agreement.

Q. 12. Give a short account, in not more than 100 words, of the United Nations Organisation and its principal organs.

Ans. The U.N.O. is an international organization of States, founded at the close of World War II as successor to the League of Nations. Its charter was signed by delegates of fifty nations at San Francisco on 26th June 1945.

Its purpose is the maintenance of international peace, the promotion of human rights, economic advancement of all people

and social progress and the provision of international machinery serving these ends. For this purpose it has six principal organs : the General Assembly, the Security Council, the Economic and Social Council, the Trusteeship Council, the Secretariat and the International Court of Justice. (100 words approximately)

Q. 13. Comment briefly on the following :—

- (i) Indian Constituent Assembly.
- (ii) The Arab League.
- (iii) Asian Relations Conference.
- (iv) The "Sargent Report."

Ans. The Indian Constituent Assembly was the remnant of the Indian Legislative Assembly which was functioning as a Coalition Govt. of the Congress and the Muslim League before the partition of the country. When India was partitioned into two Dominions, the Muslim League members left for Pakistan, while the Congress members consisting both of Hindus and Muslims formed the Indian Constituent Assembly which drew up the Draft Constitution of the country and finally its full constitution with minor amendments and fuller details which were thrashed out clause by clause in the Assembly and ultimately adopted as the Constitution of the country.

(b) The Arab League is a league of Arab countries : Egypt, Saudi Arabia, Jordan, Syria, The Lebanon, The Yemen and Iraq. Formed in 1945, its aim is to "execute agreements reached between member States, to organize periodical meetings, to reaffirm their relations and co-ordinate their political programme, with a view to effecting co-operation between them, so as to safeguard their independence and sovereignty against an aggressor."

(c) The Asian Relations Conference was an unofficial and non-political conference of academic, cultural and other organizations of Asian countries held at New Delhi. It discussed economic, social and cultural problems common to all Asian countries excluding all controversial political questions.

(d) The Sargent Report was a report dealing with educational problems and the working of educational machinery in India submitted to the Government of India by Sir John Sargent, the Educational Adviser to the Govt. of India in prepartition days.

Q. 14. What was the necessity and the purpose for bringing the United Nations Organization into being ? Has the U.N.O. succeeded in achieving the object for which it was formed ?

Ans. Two world wars within the life time of the present generation, each fought more fiercely and with greater destruction and

suffering to mankind and the second finishing with the entry of the atom bomb, brought home to every one that unless an effective organization was set up to curb vaulting ambition of a Mussolini or a Hitler, the Third World War would certainly destroy major portion of mankind. The United Nations came into being under this compelling necessity.

The purpose of the U.N. is to maintain international peace, to frame human rights, to help the under-developed countries to develop their resources and thus ameliorate the condition of all backward people both economically and socially and lastly, the provision of an international machinery to serve these ends.

The U.N. Organization has done a great deal to achieve its objects in the economic field, and through the World Bank many nations have received much needed monetary help, but it has not proved a very effective organization in deterring an aggressor from flouting its authority and keeping the world peace. The division of the world into two major blocs, one lead by the U.S.A. and the other by the U.S.S.R. and their interminable differences over every small item has made it only an instrument for trumpeting their propaganda to the outside world and has rendered it as ineffective for any strong action as its predecessor, the League of Nations. The flouting of its authority by the North Koreans, in launching a premeditated and well prepared attack on the Republic of South Korea is an instance to point. Unless people like the North Koreans are made to desist from such acts and bow before the authority of the U.N., it is sure to collapse and disappear like the League.

Q. 15. What are the chief organs of the United Nations ? On which of them is India represented ?

Ans. Following are the chief organs of the United Nations :—

(1) The General Assembly, (2) The Security Council, (3) Economic and Social Council, (4) Trusteeship Council, (5) International Court of Justice, (6) Secretariat.

India is represented in all except the Trusteeship Council. Recently the late Mr. B. N. Rau became a judge of the International Court of Justice.

Q. 16. State whether :—

(a) Scottish (b) Irish members of the House of Lords are appointed by the Crown, are legislators by hereditary right, are elected for life or are elected for the life of a Parliament.

Ans. Elected for the life of a Parliament.

Q. 17. What do you understand by the "Anti-Comintern Pact"? Which were the countries that made such a pact?

Ans. Anti-Comintern Pact. Agreement signed between Germany and Japan on November 25, 1936, opposing communism, which is regarded as a menace to peace and order. The pact received the adhesion of Italy in 1937, and of Hungary, Spain and Manchukuo and Italy in 1939. It was nullified by the defeat of Germany and her allies in 1945.

Q. 18. What is anti-Semitism? What people have suffered in recent years on account of anti-semitic feelings against them? ; in which countries, and for what reasons?

Ans. Anti-Semitism. This term means hostility to the Jews, but not to any other people, like the Arabs, who are also of Semitic origin. It is thus the Jewish people alone who have suffered in recent years in various countries of Europe on account of the anti-semitic feeling against them.

The countries where they have suffered most are :—

1. Russia, during the Czarist regime.
2. Germany, during the Nazi regime and in all countries which the Nazis occupied during the 2nd World War.
3. Italy, when Mussolini was the dictator.
4. Particularly all European countries, though the persecution of the Jews was not carried on so systematically and with such barbarity as in the countries mentioned above.

The main reasons for this anti-semitic feeling in various countries may be summed up as follows :—

(a) The Jew has proved to be a very formidable competitor specially in trade and commerce ; he has often misbehaved in business, has fattened himself by corruption and by black-marketing and in all money matters he has proved himself to be a man of a very grasping nature. This has aroused great jealousy and resentment against him.

(b) Often by his great ability, his sneaking nature, he has occupied many high positions, both in big commercial firms and in positions of authority in countries where he has been in a microscopic minority and this has aroused equally great resentment and jealousy against him, which have resulted in pogroms and racial riots.

(c) The Jews have tried to maintain their group identity throughout the preceding centuries. This exclusiveness has made them aliens in the countries of their adoption and they are regarded and treated as such.

(d) The Jews are regarded as the persecutors of Christ and during periods of religious fervour it is they who are marked as the hated race to be shunned or to be expelled or exterminated.

Q. 19. State in brief the aims and objects of the following.
Arab League ; The Atomic Energy Commission.

Ans. The Arab League. See Answer to Q. 13.

The Atomic Energy Commission. A body established in 1946 by the General Assembly of the United Nations and entrusted with the task of controlling nuclear energy, prohibiting the manufacture and use of atomic weapons, and other weapons of destruction and using an effective international inspection of the use of atomic energy, to see that the atomic energy was being used only for peaceful purposes. The Soviet Union rejected this plan as being incompatible with national sovereignty and demanded the prohibition of atomic weapons and destruction of existing atom bombs previous to any international agreement. As no agreement could be arrived at between the two great countries, the Commission in July 1949 decided to suspend its activities until the Great Powers had agreed upon a plan on which they were willing to work.

Q. 20. What is the Atlantic Charter ? Which countries were to benefit by this Charter ? Give in brief the main clauses of the Charter.

Ans. The Atlantic Charter. Declaration issued by Mr. Churchill, War-time Prime Minister of Britain, and President Roosevelt of America following meetings somewhere in the Atlantic on August 14, 1941. It contains eight points. The countries declared that they sought :

1. No aggrandisement, territorial or other ;
2. No territorial change without the wishes of the peoples concerned ;
3. The restoration of sovereign rights and self-government to those people who have been deprived of them and respect for the rights of all people to choose their own forms of government ;
4. To further access to trade and raw materials by all people ;
5. To improve labour standard, social security and economic advancement ;
6. To establish a peace in which men may live out their lives in freedom from fear and want ;
7. To enable all men to traverse the high seas and oceans without hindrance ; and

8. To disarm the aggressor nations pending the establishment of a wider and permanent system of general security and at the same time to aid and encourage all other practicable measures for lightening the burden of armaments.

In a subsequent declaration, Mr. Churchill indicated that the charter was to apply to the White peoples only, and should be accepted as a 'guide and not a rule,' whereas President Roosevelt was said to have had a wider conception of the charter.

Q. 21. What do you understand by the term "Balance of Power"? What were the methods employed to keep this 'balance'? Which were the countries that kept this "balance" and with what success?

Ans. Balance of Power. The system based on the idea that the strength of one group of powers should be equal to the strength of the other group, thus preventing any excess of power accumulating in one group and thereby ensuring peace.

The methods employed to keep this balance were the following :—

Any particular State or group which tried to expand and accumulate so much power that it became a menace to the other was prevented from doing so and where this was not possible the balance was kept by a similar increase in the power of the other group, the balancing power helping to create coalitions of the weaker States and coming to the aid of such States when they were attacked.

During the past three or four centuries England played the part of the balancing power. Thus it helped Frederic the Great when he was attacked by a coalition of Russia and Austria. England constantly formed coalitions against Napoleon I and ultimately succeeded in overthrowing him. When between 1871-1914, the German-Austrian alliance was formed, with Italy as the third partner, it was confronted by the French-Russian Alliance and Britain at once came to the help of the latter when the central powers started the First World War. Britain afterwards supported Hitlerite Germany with a view to balancing the Russian power and when Hitler grew too powerful, England turned its back upon him and formed an alliance with France. After the 2nd World War when Russia is trying to dominate the world, it is now America that is trying to keep the balance with Britain as a partner aligned to it.

Q. 22. Explain as briefly and lucidly as you can the following :

Ballot ; Bicameral Legislature ; Bill of Rights ; Bolshevism ; Collectivism ; Zionism.

Ans. Ballot. Ballot is the method of secret voting by putting a ball or ticket or paper, on which a mark has been made against the candidate of one's choice, into an urn or box. No one is made to know against which candidate the voter has made the required mark.

Bicameral Legislature. A legislature which has two Houses, the lower and the upper, as the House of Commons and the House of Lords in Great Britain.

Bill of Rights. The term refers to the statute of William and Mary of England, embodying the Declaration of Rights and accepted by them with the Crown in 1689. It contained 13 clauses, relating to parliamentary election, taxes, the army and the dispensing with or suspending the laws passed by Parliament.

A similar Bill of Rights was embodied in the constitution of the U. S. A. which guarantees essential liberties. In our own Constitution of Bharat, a comprehensive list of Fundamental Rights has been embodied and a guarantee has been given to the citizens by making them justiciable.

Bolshevism. Doctrines of the extreme Socialists or Communists who effected the Russian Revolution of 1917. Ideologically it can be said to be an alternative name for Communism, drawing its inspiration from Karl Marx. But the founder of Bolshevism, as a practical policy, was Lenin, who advocated revolution leading to dictatorship of the proletariat.

Collectivism. Political and economic system based on central planning, absence of competition and co-operation etc. Socialism, with its emphasis on nationalism and State control of industry can be said to be a kind of Collectivism.

Zionism. A Jewish movement aiming at the establishment in Palestine of a Jewish State with its capital in Jerusalem, "The city of Zion". The Zionist organisation was established at Basle in 1897. In 1948 when Britain handed back the Palestine Mandate to the U.N.O., the Jews in Palestine proclaimed the State of Israel and realised their long cherished ambition of making Jerusalem their capital soon after.

Q. 23. What do you understand by the term "Commonwealth of Nations"? Which countries are linked by this so-called Commonwealth and what is their relationship to each other?

Ans. The term Commonwealth of Nations has come to denote absolutely free association of (1) The United Kingdom of Great Britain and Northern Ireland, (2) The sovereign and independent Dominions of Canada, Australia, New Zealand, South Africa, and Ceylon, (3) The Sovereign Republic of India, and Pakistan with the British Queen only as a symbol of linking India and Pakistan with Great Britain and its Dominions on all matters of common interest and on terms of absolute equality with each other.

Q. 24. What is bureaucracy ? Name the country in which this type of Government had been working in recent years. Did it prove a success there ?

Ans. Bureaucracy is a government by an elaborate system of administrative departments run by a hierarchy of officials like the I.C.S. rule in India. The system has a tendency to become unwieldy and laborious in its operation. It produces red tape or over-systematization and is often overcharged with rigidity, conservatism and a spirit of routine. It kept India under its iron grip so long as mass consciousness was not aroused, but under the able leadership of Mahatma Gandhi, it was repeatedly challenged till England was forced first to slacken the rigidity of this system by doles of more and more democratic types of reforms both in the Centre and the provinces, and ultimately agreeing to make India a self-responsible Dominion of its empire. The system proved a success in the early stages of the British rule, when it brought order out of chaos, gave India a strong government and made orderly progress possible. It was bound ultimately to collapse, when, with the march of time, it failed by its very nature to adapt itself to changed circumstances or to meet the aspirations of the people, who repeatedly tried to break its shackles.

Q. 25. What is a caucus ? What is chauvinism ? Explain both the terms as fully as possible.

Ans. **Caucus.** It means the powerful directive nucleus of a political party. It is a grouping of the influential members who actually control the policy of the party. The organisation introduced by Chamberlain in 1878 was such a one and was so called.

Chauvinism. Exaggerated nationalism or extravagant zeal for the glory of one's country, or more broadly, exaggerated devotion to any one cause. The word springs from Nicholas Chauvin, an over-fervent adherent of Napoleon.

Q. 26. What do you understand by the following terms ? :—

- | | |
|-----------------------------|--------------------------------|
| (1) Collective security, | (2) Collective responsibility, |
| (3) A closure, | (4) The Colonial rule, |
| (5) The Concentration camp, | (6) Condominium, |
| (7) A Secular State, | (8) A Welfare State, |
| (9) Rationalisation. | |

Ans. 1. Collective Security. The system or arrangement whereby weak nations enter into multilateral alliances against a powerful and aggressive neighbour, so as to ensure their security by collective action against the aggressor, if any one of them was attacked. Thus the North Atlantic Treaty nations have entered into

such an alliance to check the much feared aggressive designs of the U.S.S.R. and will oppose collectively if any one of the members were to be attacked.

2. **Collective responsibility.** In countries with parliamentary government, as in England, the joint responsibility of the heads of the government to Parliament. Thus the Cabinet is responsible for the political actions of each of its members and each member is responsible for the actions of the Cabinet and if he is not prepared for this, he must resign.

3. **Closure.** The authoritative stopping of a parliamentary debate and coming to a decision upon the matter under consideration. This method is used to speed up the passage of important bills by curtailing debates even when no obstruction is being put against it.

4. **The Colonial Rule.** Rule by an imperialist power over a distant or even akin people, where the latter are exploited and denied self-rule. Thus the rule of England over its early colonies in North America was of the nature of the hated colonial rule even though majority of the settlers came from England.

5. **The Concentration Camp.** Prison camps used by the Nazis for the detention of political opponents, unwanted sections of the population and later on for the mass extermination of the Jews and other prisoners of war.

6. **Condominium.** The joint rule of a territory by two or more powers. Examples of condominium include the Anglo-Egyptian Sudan before that country's independence, the New Hebrides (administered by Britain and France) and of the Allied High Commission in West Berlin.

7. **Secular State.** A State whose constitution is not based on the advancement of any particular religion, caste or creed, and where every citizen, to whatever religion, caste or creed, he may belong, enjoys all the Fundamental Rights guaranteed by the constitution. He is not discriminated against, in any form whatsoever, simply on the ground of his possessing a certain creed or being member of a particular religion.

8. **A Welfare State** is a State which under the Directive Principles of State Policy strives to promote the welfare of its people by securing and protecting as effectively as possible a social order in which justice, social, economic and political inform all the institutions of the national life. These provisions also form a fundamental part of the constitution though they are not enforceable by any court.

9. **Rationalization** is the process of forming industrial concerns into large groups to reduce overhead charges, and so to lower the cost of production.

Q. 27. What are the following parties and what are their programmes of work ? :—

(i) The Hindu Mahasabha (ii) Rashtriya Swyam Sewak Sangh (iii) The Socialist Party of India (iv) The Conservative Party of Great Britain (v) The Labour Party of Great Britain.

Ans. (i) The Hindu Mahasabha. A communal organization of the Hindus. The party's origin dates back to the beginning of this century, almost simultaneously with the awakening of Muslim consciousness in 1906. During the first twenty-five years of its life, the party had to struggle for its existence against the stronger and better organized forces of nationalism represented by the Congress. But the aggressive growth of Muslim communalism during the 'thirties and onwards, gave the party an occasion to gain prominence as a counterpoise to the Muslim League. The cries of "India for Hindus", and "Akhand Hindustan" belong to this very period. The recognition of the Mahasabha by the Viceroy for consultations in 1940, brought it to the limelight. But the provincial elections in 1946 gave the Mahasabha a great set back, showing that it had no hold on the masses. The partition of the country and the consequent disappearance of the Muslim League from the Indian scene made the party recede into complete background.

After the assassination of Mahatma Gandhi, the Mahasabha Working Committee decided to close its political activities. But they again decided to enter into politics with the objective of establishing "Akhand Hindustan" and avowedly a democratic State in Hindustan. Still more recently they have adopted an eight-point political and economic programme of nationalization of land and all key industries in India.

(ii) Rashtriya Swyam Sewak Sangh. It is an organization of the Hindus of extreme communal views, whose headquarter is at Nagpur, and whose chief head is Shri Golwalkar. Its chief aim is to rejuvenate Hindu Youth by regular exercises of a semi-military nature, to make them religion conscious; and though it has no clear-cut politics, it clearly aims at establishing a Hindu State in India, as opposed to a secular State which the Congress has declared its unshaken resolve to keep going.

(iii) The Socialist Party of India. The party was formed in 1934-35 as a left-wing organization to function within the Congress fold. After the attainment of independence, the party broke away from the Congress. Its aim was the establishment of a socialist society in which the individual, i.e., the worker, the trade unions and other voluntary organizations of working men are free to exercise their legitimate rights. Mr. Jai Prakash Narain was the General Secretary of the Party. It has now merged with the K.M.P.P. Acharya Kripalani is now the leader of the new party.

(iv) **The Conservative Party of Great Britain.** The Conservative Party of Great Britain is one of the two major political parties in the country. It is a successor of the Tory Party of the Eighteenth century. As its very name indicates the party is conservative in outlook and programme of work. It is thus in favour of the existing social and economic system. It is also anti-socialist. It has always been associated with the landed interests. Its policy is directed at the maintenance of the empire, whatever has been left of it, the safeguarding of private property and the development of agriculture and private enterprise and is vehemently opposed to nationalization of all industries. In its foreign policy it is traditionally nationalist and imperialist and has constantly opposed the liberation of the colonial people struggling for their emancipation.

(v) **Labour Party of Great Britain.** The Labour Party is the political representative of labour. It was founded in 1900, to represent British labour, but it was not till 1918, that its aims and objects were clearly defined, which were : to secure for the producers by hand or by brain the full fruits of their industry and the most equitable distribution thereof that may be possible, upon the basis of the common ownership of the means of production and the best obtainable system of popular administration and control of each industry or service. The party came into power for the first time in 1923 under Ramsay Macdonald but as it was very weak, it soon fell. It was only in 1945 when it got a thumping majority that it formed a stable Labour Government under Attlee. It is now again the main Opposition.

Q. 28. What is "Co-Prosperity"? Which countries were intended to come under the system?

Ans. This was the Japanese plan of a 'Greater Asia', with Tokyo as the nucleus. The whole Eastern Asia, including the islands of Melanesia were to be organized as a political and economic region—an arrangement in which Japan would be the supreme Power. This represented the Japanese 'New Order'.

Q. 29. State, giving examples as to what you understand by : Coup D'état ; Diarchy ; Federalism and a Mandate.

Ans. Coup D'état. A violent and sudden change of government usually by a military administration or those holding high government posts and who are thus able to engineer a plot against the government and seize power. Thus in 1799, Napoleon Bonaparte, and in 1925 Mussolini seized power by a Coup D'état. So did Gen. Naguib in Egypt and the army officers in Iraq etc. etc.

Diarchy. A form of government in which the supreme power of the State is vested in two persons or bodies. In other words, it is a dual government. The Government of India Act 1919 introduced

duced a system of diarchy in the Indian provinces; one part (the more important one) of the administration was reserved for the Governor who carried it on through his officials, while the other was entrusted to the Indian Ministers who were chosen from, and were responsible to the locally elected legislature. As the Indian Ministers were entrusted with very little power and had to work under great restrictions it did not work and soon there grew up a very intense agitation against it, so that it had to be abandoned.

Federalism. System of government in which several States unite for certain matters of common interest but retain complete autonomy in internal affairs. It is opposed to unitarianism, wherein all powers are concentrated in the central authority. The division of power between the federal government and the federating States is laid down in the constitution and may vary between one another.

The U.S.A. is a federal State.

Mandate. The system under which the League of Nations entrusted the administration of former German and Turkish colonies to certain powers. The League exercised a supervisory authority over the mandated territories which has now been taken over by the Trusteeship Council of the U.N.O. Thus Iraq, Transjordan and Palestine were entrusted to Britain; Syria and Lebanon to France; Ruanda in Africa to Belgium; the German South West Africa to South Africa Union; Samoa to Newzealand; New Guinea to Australia and German Pacific islands to Japan.

Q. 30. Explain what is meant by :—

- (a) The Marshall Plan (b) The Freedom of the Seas
(c) Kuomintang (d) India's Sterling Balances.

Ans. (a) The Marshall Plan or the European Recovery Programme initiated by General Marshall, U.S. Secretary of State in June 1947, with the avowed aim of stemming the progress of communism by improving economic conditions of all the European countries which had suffered during the 2nd World War, and where there would have been great upheavals and a violent spread of communism if the much needed aid were not forthcoming swiftly and lavishly. As it was the U.S.A. alone which could render such an aid, and which would not allow communism to spread and Russian influence to grow, so by a Bill in the U.S. Congress, a Foreign Assistance Bill was passed for help to the astronomical figure of \$ 17,000,000,000 to be spent over a period of four and quarter years to end by June 30, 1952, and each country was apportioned the aid according to its needs. The countries that got this aid were Austria, Belgium, Britain, Denmark, Eire, Greece, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Sweden, Switzerland and Turkey,

(b) **The Freedom of the Seas.** The term implies the freedom that has been internationally granted to every country to carry its ships for the purpose of trade and commerce on the wide seas without let or hindrance of any kind whatsoever by any sea power. The only restrictions a country imposes is within its well-defined territorial waters for security reasons. This freedom gets restricted only during war time between belligerents.

(c) **Kuomintang (National People's Party).** Nationalist Party of China founded by Sun Yat-Sen in 1894. The party came to the forefront after the Revolution of 1912. Democratic government, an improved standard of living for the people and the recovery of the rights enjoyed by the foreigners at the expense of the Chinese were the three principal items of a programme left behind by Sun Yat-Sen in his will. The leadership fell to Chiang Kai-Shek who had to struggle hard first against the Japanese and then against the Communists. Due to nepotism, inefficiency and its right-wing tendencies the Kuomintang got thoroughly discredited, and the Communists drove Chiang Kai-Shek to Formosa, the only stronghold left in his hands.

(d) **India's Sterling Balances.** This term indicates the debt owed by Britain to India for goods and services supplied to her during the World War II. Britain owed similar debts to other countries, but the highest owed was to India, which was calculated to amount to £1,116 millions. By mutual agreements, Britain has been releasing it in instalments both to India and Pakistan according to the share of each country.

Q. 31. Explain what is meant by :—

Proportional Representation ; Referendum ; Power Politics ; Popular Democracy ; Plebiscite and Plutocracy.

Ans. Proportional Representation. An electoral system according to which the distribution of seats in a country's legislature and other bodies corresponds to that of the votes, so as to ensure the representation of minorities. It is now used at elections in Eire, Tasmania, Scandinavia and in West Germany.

Referendum. The principle or practice of submitting directly to the vote of the entire electorate legislative or political questions of a controversial nature.

Power Politics. The policy that is pursued by Big Powers of the world of maintaining and expanding national power for power's sake and looking at and trying to handle every international problem with that viewpoint, without consideration of right and justice. Thus the simple complaint that India carried to the Security Council that the State of Pakistan had made an aggression on Jammu and Kashmir was never considered on its merits, ...

were wire pullings from behind and evasions of the real issue by the Big Powers, so that the original complaint was sidetracked and was enmeshed in non-essential and side issues and was never taken up straight on its merits, i.e., whether or not the Pakistan State had made an aggression on the State of Jammu and Kashmir. In the case of the Korean dispute, the Security Council at once named North Korea as the aggressor, because except the U.S.S.R., all other Big Powers were directly and immediately concerned in trumpeting this fact to the whole world and thereby justifying their actions in sending their armies to oppose the North Koreans.

Popular Democracy. This term is used by the Communists who describe the democracy of the people based on Communist ideology as the real popular democracy as opposed to the democracy of the capitalistic type like that of the U.S.A. or even of the Socialistic type like that of Great Britain.

Plebiscite. A vote on some disputed point taken among all the members of a given community. Such a plebiscite was taken after 1st World War about the joining of Saar with Germany or France and such a plebiscite was announced to be held in the State of Jammu and Kashmir to determine whether the people would like their State to accede to India or Pakistan.

Plutocracy. Government carried on by the wealthy section of the community.

Q. 32. Explain the following :—

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| (a) By-election, | (b) Plural voting, |
| (c) The casting vote, | (d) Vote of censure, |
| (e) A ballot paper, | (f) Returning officer. |

Ans. (a) By-election. Election to a seat rendered vacant during the running term of an elected body. This might occur on resignation, death or any other subsequent disqualification of the member originally elected.

(b) Plural voting. System allowing a person to cast more than one vote in the same election. The voter is eligible to vote in more than one constituency by virtue of his special position, e.g., a city and a university vote may be enjoyed by the same person. This was a common practice in Britain, but has now practically disappeared on account of strong public opinion against it.

(c) Casting vote. The deciding vote of a chairman in the case of a tie.

(d) Vote of censure. A vote against the official party in power to censure any of its obnoxious act.

(e) Ballot paper. The paper used for marking against the natural, secret candidate of the voter's choice. This is done secretly to avoid intimidation.

(f) **Returning officer.** The official responsible for the arrangements made to hold a parliamentary election. This officer receives the nominations, and the customary fees from each candidate, announces the result, and reports it in proper form to the speaker.

Q. 33. What is :—

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|---------------------|-------------------|
| (a) a Protocol, | (b) a Utopia, |
| (c) a Quorum, | (d) a Red robbin, |
| (e) Naturalization. | |

Ans. (a) Protocol. The first draft of a diplomatic document used specially of treaties before their definitive signature.

(b) **Utopia.** Name given by Sir Thomas Moore to the imaginary commonwealth which he described in his *Utopia* published in 1526 and represented as possessing a perfect political organization. This term is applied also to similar dream countries of writers like Platos' *Republic*, Bacon's *Atlantis* and Campanellas' *City of the Sun*. The name is derived from Greek words meaning "Nowhere."

(c) **Quorum.** The minimum number of members whose presence is essential in order to constitute a house, which can lawfully transact official business.

(d) **Red Robbin.** A document or a petition which has been signed in such a manner that one cannot discover the order in which the signatures were put on it.

(e) **Naturalization.** The word is used for the admission of a foreign national to the citizenship of the country he wants to adopt.

Q. 34. What are :—

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|-----------------------|-------------------|
| (a) Benelux, | (b) Ku Klux Clan, |
| (c) The Haganah, | (d) Cominform, |
| (e) Irgun Zvai Leumi, | (f) Falange. |

Ans. (a) Benelux, an abbreviated name for Belgium-Netherlands-Luxembourg and specially for the economic grouping of the three "Low Countries."

The union was established in 1947 under which import duties were abolished within the union and uniform duties imposed on imports from other States.

(b) **Ku Klux Clan.** American Secret Society established in Tennessee, Southern parts of the U.S.A. in 1865. It stood for white supremacy in the Southern States and is anti-Negro, and anti-Jewish in outlook. It has won world-wide notoriety by its use of cruel and terroristic methods, specially night raids, whipping and murder, notoriously by lynching.

(c) **Haganah.** The regular military organization of the Jews in Palestine. It came into being during the Turkish rule to protect the much harassed Jewish settlements. Unlike the Stern Gang and the Irgun Zvai Leumi, it never resorted to terrorist methods. It is now the national army of the State of Israel.

(d) **Cominform** is the name for the Communist Information Bureau, founded in 1944 as an agency of Russian control of the Communist countries of E. Europe.

(e) **Irgun Zvai Leumi.** An organization, like a similar one, the Stern Gang, which brutally murdered British soldiers and systematically carried on other terrorist activities against British forces with the purpose of forcing them out of Palestine.

(f) **Falange.** The Fascist Party of General Franco. It was formed in 1937.

Q. 35. Write what you mean by the following :—

(a) Lock-out,

(b) Reparations,

(c) The Iron Curtain,

(d) A Civil Disobedience,

(e) The Monroe Doctrine.

Ans. (a) Lock-out. Mass expulsion of employees from work by the employer. It is usually resorted to by employers when the employees make exorbitant demands on them.

(b) **Reparations.** Indemnities to be paid by a defeated nation for the damage done in a war. The term refers particularly to the indemnity demanded of Germany by the Allies after the 1st World War. This was fixed at £6,000,000,000 payable in bonds. Germany was never able to meet her liabilities, till they were repudiated by Hitler.

(c) **The Iron Curtain.** This term denotes the sealing off by the U.S.S.R. of all the satellite countries behind the Stettin-Trieste line in Europe so that the rest of the world does not know what is happening in these countries.

(d) **Civil Disobedience.** Name given to the Indian Nationalist movement inaugurated and led by Mahatma Gandhi. Truth and non-violence were its two cardinal principles and the movement aimed at peaceful withdrawal of British authority from India. No-tax campaign of Bardoli (1928) and the Salt Satyagraha of 1930-31 can be cited as examples.

(e) **Monroe Doctrine.** Doctrine enshrined in a message sent to the United States Congress on December 2, 1823, by James Monroe, declaring that the American continents, by the free and independent condition which they have assumed and maintained, are henceforth not to be considered as subjects of future colonization by

any European Powers. The doctrine is, however, not popular in the Latin American States which suspect it of being a U.S. hegemony and economic penetration.

Q. 36. State what the following symbols signify :—

The Cross; the Crescent; Swastika; Stars and Stripes; Hammer and Sickle.

Ans. The Cross refers in particular to the stake on which Christ was sacrificed. It is the recognised symbol of the Christian faith.

The Crescent is the symbol of the Muslim faith as the Cross is that of the Christians. The symbol is that of the curved shape of the moon during its first quarter, with a number of stars inside the curve. The Muslim countries have been using this symbol for centuries on their banners and have fought under it.

Swastika. The Swastika is the mystic symbol of the early Aryans. It was used as a badge by extreme German nationalists after the 1st World War, and as this movement grew into the Nazi movement the Nazis adopted it as their symbol about 1920 and this mark was put on the Nazi Flag since 1935. It thus represented the aggressive Nazi movement of the Germans.

Stars and Stripes is the symbol of the U.S.A. which is used as such on the flag of the U.S.A. It has thirteen horizontal stripes in alternate red and white with 48 stars, white on a blue field. Daring is denoted by the red stripes, and purity by the white, 48 stars denote the Union of the 48 States which make the U.S.A.

Hammer and Sickle is the symbol on the flag of the U.S.S.R., representing the worker in the factory by the hammer, and the worker in the field by the sickle.

Q. 37. Of what countries are the State legislature named as follows?

Dail, Majlis, Diet, Congress, Reischtag, Barlaman, Eduskunta, Storting and Cortes.

Ans. The following are the countries of which the House of Legislature or Parliament is called :

Dail	that	of	Eire (Southern Ireland)
Majlis	"	"	Iran (or Persia)
Diet	"	"	Germany
Congress	"	"	U.S.A.
Reischtag	"	"	Denmark
P.	"	"	Egypt
(e) The Cortes	"	"	Finland
Storting	"	"	Norway
Cortes	"	"	Spain

Q. 38. Explain what is meant by :—

(1) Security Council, (2) UNESCO, (3) Joint Electorates.

Ans. (1) Security Council. The Security Council is the organ of the U.N. charged with the responsibility of maintaining peace and security. It has eleven members, of whom five are permanent, while six are elected by the General Assembly for two years.

2. UNESCO is the abbreviated name for the Educational, Scientific and Cultural Organisation of the United Nations, which has been set up with the chief purpose of promoting international cultural collaboration, mutual understanding, popular education, the diffusion of knowledge, health and related matters. It co-ordinates the activities of such specialised agencies as the International Labour Organisation, the Food and Agriculture Organization, and the United Nations Educational, Scientific and Cultural Organisation.

3. Joint Electorates. The system whereby the voters of all the communities in a country select candidates for membership to the legislature or other bodies jointly, without the candidates standing as representatives of separate religious communities. The candidates are chosen on the basis of merit and not because they represent any particular community.

Q. 39. (a) Who started the policy of merging the Indian States into Union ?

(b) Name any one of these Unions and the States which merged into it ?

Ans. (a) The late Sardar Patel.

(b) Patiala and East Punjab States Union.

The States comprising the Union were Patiala, Kapurthala, Nabha, Faridkot, Jind, Malerkotla, Nalagarh and Kalsia.

Q. 40. Name the present sovereign heads of the following States, saying whether King, Queen or President.

- | | | |
|----------------|----------------|----------------|
| (1) Argentina, | (2) Australia, | (3) Belgium, |
| (4) Pakistan, | (5) Denmark, | (6) Iceland, |
| (7) U.A.R., | (8) Russia, | (9) Rajasthan, |
| (10) England, | (11) Holland, | (12) Norway, |
| (13) Sweden, | (14) Greece, | (15) Japan, |
| (16) Ethiopia. | | |

Ans. 1. President :

2. Queen : Elizabeth II.

3. King : Prince Baudouin.
4. President : Gen. Ayub Khan.
5. King : Frederick IX.
6. President : Asgeir Asgeirsson.
7. President : Col. Nasser.
8. President : Marshal Kliment E. Voroshilov,
9. Governor : Gurmukh Nihal Singh.
10. Queen : Elizabeth II.
11. Queen : Juliana.
12. King : Hakaon VII.
13. King : Gustav VI Adolf.
14. King : Paul I.
15. Emperor or Mikado : Herohito.
16. King : Haile Silassie I.

Q. 41. Comment briefly on :—

- (a) Proportional Representation.
- (b) The Security Council.
- (c) The Marshall Plan.
- (d) The Statute of Westminster.
- (e) The Sterling Balances.

Ans. (a) See answer to Q. 31 for Proportional Representation.

(b) The Security Council is one of the organs of the United Nations Organisation which is responsible for world peace and is advised by military experts and by an Atomic Energy Commission. It is also on the recommendation of the Security Council that new members are accepted, wherein seven of its eleven members, including the five permanent members, must approve.

(c) Consult Q. 30 for the Marshall Plan.

(d) The Statute of Westminster. This was an Act passed in 1931 by the British Parliament to make its Dominions equal in status to Britain. The Act abolished the right of the British Parliament to legislate for the Dominions, or to disallow Bills passed by them and it empowered the Dominion Parliaments to repeal or amend Acts of the British Parliament applying to them.

(e) The Sterling Balances are the debts owed by Britain to certain countries for goods and services supplied to her during World War II. In 1945 they were estimated at £3,277,000,000.

She owed the highest amount to India (for this consult Q. 30, part c).

Q. 42. Describe briefly the manner in which the complicated problem of States was dealt with by the Government of India since August 15, 1947.

Ans. The complicated and difficult question of dealing with the various princely states was dealt with as follows :

1. In July 1947 the Government of India formed a Ministry of States and took over the functions of the old Political Department. Sardar Patel assumed charge of this ministry. His ministry drew up an instrument of accession which was easily acceptable both to the Government of India and the princes. By this, by 15th of August 1947, as many as 136 Salute and fully jurisdictional States acceded to the Union. This was the first phase.

2. Next began the process of integrating the States and other territories and demarcation of the boundaries. This was done under a fourfold process, (i) recognition of premier States as viable units, (ii) taking over of the administration of some States by the Centre, (iii) merging States with neighbouring provinces, (iv) integrating a number of smaller States with the contiguous territories and forming unions of States.

Only Junagarh, Hyderabad and Kashmir did not join the union. Junagarh joined India when by a popular uprising the Nawab fled to Pakistan, while Hyderabad acceded by a police action which the government was obliged to take due to the activities of the Razakars. The fate of Jammu and Kashmir State is still undecided.

Q. 43. What do you mean by the followings ? :—

- | | |
|--------------------------------|-------------------------------|
| (a) <i>Magnum opus</i> , | (b) <i>Modus Vivendi</i> , |
| (c) <i>Persona non grata</i> , | (d) <i>Au revoir</i> , |
| (e) <i>Noblesse oblige</i> , | (f) <i>Peccavi</i> , |
| (g) <i>Vox Populi</i> , | (h) <i>Mutatis Mutandis</i> , |
| (i) <i>Par Excellence</i> , | (j) <i>Ad hoc</i> . |

Ans. (a) *Magnum opus* : A great work.

(b) *Modus Vivendi* : An arrangement or a compromise by means of which persons or parties differing greatly are enabled to get on together for a time.

(c) *Persona non grata* : An unwanted person.

(d) *Au revoir* : Adieu until we meet again.

(e) *Noblesse oblige* : Rank imposes obligations.

(f) *Peccavi* : I have sinned.

- (g) *Vox Populi* : The voice of the people.
- (h) *Mutatis Mutandis* : With necessary changes.
- (i) *Par Excellence* : Eminently; by way of ideal.
- (j) *Ad hoc* : For this purpose or object.

Q. 44. What is a veto ? Who has used it in recent years, where and for what purpose ?

Ans. **The Veto.** Name given to the right of a sovereign, the head of a State or any competent person or body to prevent the enactment or the operation of a law. Thus the President of the U.S.A. has the power of vetoing any legislation, though it can be overridden by a two-thirds majority in both Houses of Congress. In India the Viceroy had the power of "certification," so that he could veto any Bill passed by the Indian Legislature or when a Bill was rejected he could certify that it had been passed and thus became law in spite of an overwhelming majority rejecting it.

The power of the veto has been possessed by the five permanent members of the Security Council. It is in this Council that it has been frequently used by the Big Powers to reject all Bills which they think go against their wishes or interest and have thus paralysed the United Nations by repeated use of the veto. Thus the veto was used to deny Burma, Finland and some other important States entry to the U.N. The applications of Eire, Ceylon, Transjordan, Portugal, Italy and Finland were vetoed by the U.S.S.R., while that of Albania, Bulgaria, Hungary, Rumania and Outer Mongolia were vetoed by Britain and the U.S.A.

Q. 45. Write short notes on :—

The Western Union ; United Nations ; Central Powers.

Ans. **Western Union.** Name given to the close association of West European countries which are outside the influence of the U.S.S.R. and are aiming at creating a military, political and commercial unit. They are the five important countries..... Britain, France, Belgium, the Netherland and Luxembourg, also, Italy, Austria and Western Germany. The Scandinavian countries have also come within the Union. The Western Union is not yet a federation and is only a defensive alliance against the Russian group of States. Plans for widening it into a full-fledged European federation persist and it may come into being by the force of circumstances.

United Nations. An association of States pledged to maintain international peace and security. The organization is based on the charter drawn up by the San Francisco Conference in 1945. The purposes of the U.N. Charter are : (1) to maintain international peace and security ; (2) to develop friendly relations among nations ; (3) to achieve international co-operation in the solution of economic, social,

cultural and humanitarian problems ; and (4) to provide an international centre for the attainment of these ends.

The U.N.O. works through its six principal organs : (1) General Assembly, (2) Security Council, (3) Economic and Social Council, (4) Trusteeship Council, (5) International Court of Justice, and (6) Secretariat.

Central Powers. The term stands for the combination of Germany, Austria, Turkey and Bulgaria during the World War of 1914-18.

Q. 46. What do the following terms mean ?

(1) Division of Powers (2) The Dollar Diplomacy (3) An Electoral College (4) Extra-territoriality (5) Status quo (6) Ipso facto (7) De facto (8) Locus Standi.

Ans. 1. The separation of powers in a government, specially into legislative, executive and judicial, so that no one usurps the functions of the others and tyrannise over the community by combining all in one body or person, as the executive is prone to usurp them.

2. The term is sarcastically applied to the invisible but very potent influence the U.S.A. wields in those foreign countries which it obliges and makes its debtor, by lavishly supplying aid in money they so urgently need, and thus keeping them under its thumb. Instead of direct intervention "it substitutes dollars for bullets."

3. A body of persons other than the people who elect their representatives. Thus the President of the Indian Union is elected by the members of an electoral college consisting of—

(a) the elected members of both Houses of Parliament ; and

(b) the elected members of the Legislative Assemblies of the States.

4. The privilege given by international law to embassies, legations etc. of being considered outside the territory and therefore the jurisdiction of the State to which they are sent. They are not subject to its laws and may not be entered by its officials, including the police. Diplomatic personnel may not similarly be arrested by the host country's authorities, nor searches made into their private apartments.

5. As the position was before.

6. In the fact itself. Virtually.

7. From the fact, really, actual.

8. A right to interfere ; a place for standing,

Q. 47. Who are or were the following ? :—

(1) The Khudai Khidmatgars (2) The Praja Mandal (3) The Khaksars (4) The Forward Bloc (5) The Fabian Society (6) The Boston Tea Party (7) The Iron Guards (8) The Popular Front (9) The Chamber of Princes.

Ans. 1. Khudai Khidmatgars. A political party brought into existence by the Khan Brothers in the North-West Frontier Province of Pre-partition India with aims and objects similar to that of the Indian National Congress and working side by side with the Congress on purely national lines. Its greatest effort was to work selflessly for the uplift of the masses, to eschew violence, to bring about Hindu Muslim Unity and to achieve independence for India.

2. The Praja Mandal. A political party that worked with aims and objects similar to those of the Indian National Congress in the Indian States and demanded the establishment of popularly elected governments in place of the feudal types prevailing during the British Raj.

3. Khaksars. A semi-military organization of the Muslims brought into being by Alama Mashriqi. During its military drills its members used shovel, instead of the gun, which they could not take up on account of the Arms Act.

4. The Forward Bloc. The extreme left-wing party of the Congress organized by Subhas Chandra Bose, to whom the Indian National Congress appeared to be a very sluggish and conservative body dominated by old men like Mahatma Gandhi, who often made compromises with the British imperialists. It formed itself into a separate party later on but was declared illegal in 1940. The ban was lifted in 1946 after which it severed its connection with the Congress altogether.

The party has now adopted as its objective the establishment of a "Socialist State" in India with complete severance of relations with the "Commonwealth of Nations."

5. The Fabian Society. A society of British socialists established in 1883. It believes in evolutionary methods and hopes to achieve socialism by gradual reform. George Bernard Shaw, Sidney and Beatrice Webb were its one time principal members.

6. The Boston Tea Party. The party of Boston inhabitants, who, as a protest against the unfair taxation policy of the British Government, emptied cargoes of tea valued at £18,000 into the sea in 1773. It was in fact a forerunner of the rebellion of the American colonies against Britain.

7. Iron Guards. Rumanian Fascist Organization founded in 1927 by Corneliu Codreanu. It was violently nationalist, anti-

democratic and extremely anti-semitic. It used the ruthless method of torture and assassination like the equally notorious Ku Klux Klan in America or the extreme Nazis in Germany. It was officially abolished in 1941.

8. **Popular Front.** A suggestion for political collaboration of Liberals, Socialists, Communists and other Centre and Left-wing parties against Nazism and fascism put forward by the Communist International in 1935. Popular Front Governments were set up in Spain and France but could not last long.

9. **The Chamber of Princes.** Name applied to the body officially created by the British Government to represent and voice the views of Indian Princes on matters that concerned their States, and on other current political, economic and social topics. These views were those of the princes alone in their capacity as rulers of their States, and their views and demands were not those of their subjects. They were often extremely anti-democratic and subservient to their masters. Later it came only to voice the wishes and then the efforts of the princes to retain their *status quo* when the British authority was withdrawn from India.

Q. 48. What do you understand by—

Pan-Americanism ; Pan-Islamism ; Pan-Slavism, and Pan-Germanism.

Ans. Pan-Americanism. The idea of a political union between all the States of North and South America.

Pan-Islamism. A movement striving for close political co-operation among all the Islamic people and in the end the establishment of an All-Islamic Empire or Federation.

Pan-Slavism. The idea of common policy or even union of all Slav people. Russia has been taking a leading part in the movements since 1860, but is suspected of using it as an instrument of Russian imperialism.

Pan-Germanism. The aim of uniting all German speaking people in a common empire. Herr Class started the movement before the World War of 1914-18, which was later on taken up by Herr Hitler, and partially fulfilled by the annexation of Austria and Sudetanland. The movement also had Alsace-Lorraine, Luxembourg and German-speaking Switzerland under its purview.

Q. 49. For what purpose were the following conferences held, who were the parties taking part in them and what was the outcome of each of these conferences ?

(1) The Dumbarton Oakes Conference (2) Bretton Woods Conference (3) San Francisco Conference and (4) the Yalta Conference.

Ans. 1. The Dumbarton Oakes Conference. A conference of the representatives of the Governments of Britain, U.S.A., Russia and China held at Dumbarton Oakes from August 21 to October 7, 1944, on the means of maintaining international peace and security on the conclusion of the world war then raging. These representatives had no power to take final decisions. Their purpose was to formulate proposals and then submit a joint report to their respective governments. It was in this conference that the recommendation to create the United Nations and to replace the League of Nations was made.

2. Bretton Woods Conference. A conference of 44 Governments held at Bretton Woods (U.S.A.) in July 1944. It considered the monetary proposals previously put forward by the Governments of Britain and U.S.A.

To promote international monetary co-operation, to facilitate the expansion and balanced growth of international trade, to promote stability, to assist in the establishment of a multilateral system of payments and to help countries adjust their balance of payments were the main objectives of the Conference. To attain these objectives, the Conference recommended the institution of an International Monetary Fund and the establishment of an International Bank for Reconstruction and Development.

3. San Francisco Conference. A conference of the representatives of the United Nations, held in accordance with the decisions reached at the Yalta Conference from April 25 to June 26, 1945, namely, to draw up the constitution of the U.N.O., which it did.

4. Yalta Conference. A conference between President Roosevelt, Mr. Churchill, and Marshal Stalin, held at Yalta in the Crimea in February 1945. In this conference decisions were taken on the occupation and administration of defeated Germany, future of the countries liberated from the yoke of Germany and Italy, the future set-up of Polish administration and the proposal for a conference at Washington to thrash out the details of the proposed permanent machinery of consultation i.e. the U.N.O.

Q. 50. What were the following pacts and how did each one of them work ?

The Poona Pact, Tripartite Pact, Pact of Washington, North Atlantic Treaty.

Ans. The Poona Pact. A pact between the Congress represented by Mahatma Gandhi and Dr. Ambedkar, representative of the Harijans, whereby the Harijans were to be given special representation in the legislative and other bodies of India, on their abjuring claims of being a separate community, who had nothing to do with the caste Hindus.

Tripartite Pact. Pact signed by the Governments of Germany, Italy and Japan, at Berlin on September 27, 1940, and later acceded to by Hungary, Rumania, Slovakia, Bulgaria and Croatia. The signatories undertook to co-operate with one another "in Greater East Asia and the regions of Europe respectively wherein it is their prime purpose to establish and maintain a new order of things calculated to promote the mutual prosperity and welfare of the peoples concerned."

Pact of Washington. Twenty-six Allied countries at war with Axis Powers signed a joint declaration at Washington in January, 1942. They pledged themselves to employ their full resources to defeat the enemy and not to conclude a separate peace or armistice. Other Allied Powers signed the pact subsequently.

North Atlantic Treaty. A treaty of regional alliance by North Atlantic nations (U. S. A., Canada, Great Britain, France, Belgium, Netherlands, Denmark, Sweden, Norway, Luxembourg, Italy and Portugal), signed at Washington on April 4, 1949. The Agreement pledges the signatories to recognize attack on one as an attack on all, to consult together when their territorial integrity, political independence or security is threatened in any part of the world, to do everything to strengthen their free institutions and to eliminate conflict between themselves in the economic field. The pact consists of 13 clauses and is valid in the first instance for ten years, after which it can be renewed for another 10 years.

Q. 51. Write brief notes on :—

- | | |
|------------------------|-----------------------|
| (a) The Dreyfus case. | (b) The Nobel Prizes. |
| (c) The Atlantic Pact. | (d) The Iron Curtain. |

Ans. (a) The Dreyfus Case. Alfred Dreyfus was a French Jew, captain of French Artillery who was court marshalled, because he was alleged to have revealed to a foreign Power secrets of national defence and sentenced to perpetual imprisonment, and was sent to Devil's island. He was, however, regarded as innocent and a fresh trial took place. Though a verdict of "guilty" was given, he was discharged, taken in the army, and the Legion of Honour was conferred on him.

(b) Nobel Prizes are the prizes awarded for exceptionally fine work in physics, chemistry, medicine, literature or for any work that promotes international peace. Founded by Alfred Nobel, a Swedish Chemist, the inventor of dynamite, who had amassed immense fortune, and who devoted a part of that fortune in founding the famous prizes (valued at about £8,500).

(c) The North Atlantic Pact is a treaty signed by representatives of Great Britain, U. S. A., Canada, Norway, Denmark, France, the Benelux countries and Italy, guaranteeing mutual aid if any

other Power attacks any one of them. It came into force in September 1949. (See also Question 50).

(d) **The Iron Curtain.** Term denoting the Stetin-Trieste line in Europe, the territories to the east of which are directly or indirectly controlled by the U. S. S. R. The term was coined by Sir Winston Churchill when he referred to the fact that the U. S. S. R. had sealed off the lands behind this line so that the people of one part of Europe knew little of what was happening in the other part.

Q. 52. Explain the following terms :—

- | | |
|---|------------------------------|
| (a) Compromise. | (b) Thalweg. |
| (c) Usucapation. | (d) Three-mile Limit. |
| (e) Veto in the Security Council of the U.N.O. | |

Ans. (a) Compromise is a settlement of difference by mutual concession or adjustment of one's theories or principles.

(b) **Thalweg** is the word used for the deepest part of a valley.

(c) **Usucapation** is the acquisition of property in anything by possession and enjoyment for a certain term of years.

(d) **Three-mile limit** is the territorial waters extending 3 miles from the coast and governed by international law. No vessel of a foreign country can enter waters on the coastlines without permission of the country whose territory forms the coastline.

(e) Consult answer to Q. 44.

Q. 53. Mention the important steps the Government of India have taken since January 1950 to settle the problem of minorities in India.

Ans. The minorities in West Pakistan had been driven out bag and baggage, but there still live a large minority of the Hindus in East Pakistan and of the Muslims in India. Not satisfied with driving out the Hindus from West Pakistan, it seemed conditions were being created in East Pakistan where life and property of the Hindus were not safe and everyday columns of newspapers splashed news of indignities heaped upon the Hindus, forcible conversions and ejections, so much so that millions began to be on the move across the border into India and vice versa.

Mr. Nehru did not want to witness the ugly drama of communal frenzy, rape and loot and murder which had been enacted at the eve of partition and he wrote to the late Mr. Liaqat Ali to meet him in New Delhi and thrash out the vexed problem of minorities whereby they could live in peace in both the countries. Accordingly, a meeting took place in April 1950 and the well known

Delhi Pact was signed by the two Prime Ministers. The two countries agreed to :

(i) Give protection to the minorities in their respective countries with regard to their persons, their properties, and their religious worship.

(ii) That the minorities in both countries will be regarded as their citizens and as such will share all the privileges enjoyed by the majority community.

(iii) That atmosphere and conditions would be created in both the countries by which all rancour and feelings of ill-will are removed for the minorities.

(iv) That those who wish to migrate would be allowed to do so without let or hindrance and that all harassments at custom barriers would be removed.

(v) That there would be appointed ministers by both the countries who would see to the implementation of the agreement arrived at between the two countries, tour the affected areas in both the countries and make reports of their observations.

Thus this vexed question of minorities was successfully tackled and the two countries have faithfully carried out the agreement.

Q. 54. What were the Declaration of Lima, The Havana Declaration and the Moscow Declaration? State them as concisely as you can.

Ans. Declaration of Lima. Declaration adopted at the Lima Conference on the Pan-American Union in 1938. This stated that in the event of the peace, security or territorial integrity of any American Republic being threatened, such threat would be the common concern of all the member States of the Union and that they would take such steps as the circumstances warranted, without prejudice to their individual sovereignty.

The Havana Declaration. A declaration made at the Havana Conference (1928) of the Pan-American Union to the effect that the American States would adopt 'obligatory arbitration as the means for the pacific solution of their differences of a judicial character.'

Moscow Declaration. A four-point declaration made by the Foreign Ministers of U.S.A., Britain and Russia in Moscow in October 1943. The points were :

1. Closest possible collaboration in the prosecution of war, co-operation among the signatories for the organisation and maintenance of peace and security after the conclusion of the war, recognition of the needs to establish a general international organiza-

tion, need for joint consultation before employing military forces within the territories of other States and taking of steps to ensure future regulations of armaments.

2. The establishment in London of a European Advisory Commission consisting of the three signatories.

3. An Advisory Council on Italy to consider questions other than military.

4. Provision for the trials of war.

Q. 55. Why did India refuse to remain a Dominion of the British Empire, yet remained a member of the Commonwealth of Nations? What arguments have been given in its favour by the Minister holding the foreign Affairs portfolio?

Ans. India wanted to become a sovereign democratic Republic choosing its own President, its own legislature and running the machinery of government entirely free from any outside interference, however nominal, and in accordance with the Constitution it had adopted. India therefore could not remain a dominion of the British empire, as otherwise, the English King would be represented by his nominee, the governor-general, and though the latter would have but nominal authority as in other Dominions, still the status of India would not have been that of an independent Republic. This India could not tolerate and therefore decided to become a full-fledged sovereign State instead of remaining a dominion of the British Empire.

India also did not want to lose the advantage of remaining a member of the Commonwealth, for by remaining its member, its nationals would be treated in Great Britain and in other Dominions not as aliens of a foreign independent country but as citizens of its member nations and therefore entitled to the privileges enjoyed by nationals of the Commonwealth. India's proposal that the King should be only a symbol and nothing more than that to serve as a link between her and the Commonwealth was accepted and henceforth the British Commonwealth was to be converted to "Commonwealth of Nations". India thus gained the advantages she wanted to have by being a member of the "Commonwealth" as well as becoming a full sovereign State.

Q. 56. Name all the principal parties in India that worked in the political arena before the partition of the country. Which of them are now a living force in the country? Which new parties have come into being since?

Ans. The following were the political parties in India before partition:

(1) Indian National Congress, (2) Muslim League, (3) Hindu Mahasabha, (4) Socialist Party of India, (5) Communist Party of India, (6) Forward Bloc, (7) Socialist Republican Party, (8) Radical Democratic Party, (9) Scheduled Castes Federation, (10) Shia Political Conference, (11) National Liberal Federation, (12) Ahrar Party, (13) Akali Party, (14) Kisan Party, (15) All India Muslim Majlis, (16) Jumiat-ul-Ulema Hind, (17) Momin Ansar Conference, (18) The Revolutionary Socialist Party of India, (19) The Revolutionary Communist Party of India, (20) Democratic Vanguard, (21) Bolshevik Party of India, (22) Rashtriya Swayam Sewak Sangh.

Except the Indian National Congress, the Hindu Mahasabha, Socialist Party of India, Communist Party of India, the Akali Party and Rashtriya Swayam Sevak Sangh, all others have either ceased to function or they have lost their former political importance or become dormant if not gone out of existence altogether.

The most important new political parties are : The Jan Sangh, the Ram Rajya Parishad and the Praja-Socialist Party.

Q. 57. State the names of and the portfolios assigned to ten various Deputy Ministers in the Union of Bharat.

Ans. Following are the Deputy Ministers and the portfolios assigned to them :—

Mr. Jaisukhlal Hathee : Irrigation, and Power.

Mr. Surjit Singh Majithia and *Mr. Raghuramiah* : Defence.

Mr. P. S. Naskar : Rehabilitation.

Mr. Shah Nawaz Khan : Railway and Transport.

Mr. Violet Alva : Home.

Mr. Krishnappa : Food and Agriculture.

Mr. Mishra : Planning.

Mr. Bali Ram Bhagat : Finance.

Mr. Hajarnavis : Law.

Mrs. Menon : External Affairs.

Q. 58. Name some of the kings who have lost their thrones due to political upheavals in various countries of Europe during recent years.

Ans. The following are the kings who have lost their thrones in recent years due to political upheavals :

1. Peter of Yugoslavia.

2. Michael of Rumania.

3. Simeon of Bulgaria.
4. Zog of Albania.
5. King Victor Emmanuel of Italy.
6. King Leopold of Belgium.
7. King Farouk of Egypt.
8. King Faizel of Iraq.

Q. 59. What do you understand by Gandhism, Marxism and Socialism ?

Ans. Gandhism. Life to Mahatma Gandhi was a constant process of creation and no philosophy of life according to him could be compressed within the wooden frame-work of any system of thought. He did not believe that mere reason was adequate to give us a complete understanding of life. Faith formed an equally important part of his approach. It is therefore difficult to treat Gandhism as a rigid system of thought like Marxism or Communism.

Gandhiji regarded himself as an humble seeker of Truth and identified himself completely with all aspects and expressions of life in order to get a glimpse of that truth. This although makes Gandhism a complete philosophy of life, it does not however claim to be perfect, because an endless and perpetual seeking after truth still remains an inevitable feature of it. From this point of view Gandhism is neither a philosophy, nor a dogma of life, but a *Sadhana* (striving) for it. And the speciality which distinguishes this *Sadhana* from similar religious approaches is the successful attempt at a wholesome synthesis of the apparently opposing concept of *Sanyas* (renunciation) and *Karma Yoga* (action) in the evolution of a new religion of humanity. Added to these Gandhiji's attempt to solve all the problems of human life through non-violence represents the highest urge of this age.

Gandhiji also aims at a classless society, and also on the utmost purity of means along with ends. Though he was a social revolutionary, he did not, however, believe in the destruction of the existing institutions. He felt that since social institutions are man's creation they can be destroyed only by bringing about a revolution in the human mind.

Marxism. The Socialist doctrine following the theories of Karl Marx. The theory is influenced by German philosophy, particularly the dialectical materialism of Hegel. It looks upon economic conditions as the basis of life ; political and ideological systems being merely the "Superstructure" above them. Its principal tenets are :—

1. History is a series of class struggles ;
2. All value is the product of labour.

3. Capitalists pay the workers less and keep the 'Surplus value' for themselves.

4. This exploitation leads to the creation of a starving proletariat, who rise in revolution and establish the dictatorship of the Proletariat.

5. Abolition of all private property and inequality of opportunity.

6. Establishment of a classless and Stateless society, whose guiding principle will be "from everybody according to his capacity and to everybody according to his needs." Marxism is a complete and consistent philosophy which has influenced almost every branch of political and economic thought during the last 70 years.

Socialism. 'A theory or policy of social organization which aims at or advocates the ownership and control of the means of production, capital, land, property, etc., by the community as a whole, and their administration or distribution in the interest of all'—(*Oxford English Dictionary*). The term is used both to cover all movements with this aim, e.g., Communism, Anarchism, Syndicalism etc. and more narrowly for Evolutionary Socialism or Social Democracy.

Q. 60. What is the Sarvodaya Samaj? What are its objectives and what has it achieved?

Ans. The Sarvodaya Samaj is a Gandhian fellowship on an international scale started after the assassination of Mahatma Gandhi. It is an organization of a voluntary brotherhood of constructive workers who have faith in the Gandhian idealism of truth and non-violence. The central idea of the way of Sarvodaya life is its basic creed, namely, insistence on the purity of means in the same way as of ends. The Samaj maintains a register of Sewaks, i.e., persons who believe in the Gandhian ideal of life and want to take part in realizing them. Khadi, Harijan uplift, service of the Adibasis, leprosy relief work and promotion of communal harmony form part of their activities.

Shanti Seva Dal (peace brigade) is its active organ engaged in restoring communal harmony.

Q. 61. State in brief the Indo-Pakistan Pact on minorities. State whether it has achieved the object for which it was made giving in brief your reasons for your views.

Ans. Indo-Pakistan Pact on Minorities. See answer to Q. 53.

Q. 62. What is meant by :—

(a) A blue book.

(b) Agony Column.

(c) Stop Press.

(d) The Fourth Estate.

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|--------------------------|--------------------|
| (e) Third degree Method. | (f) A sea dog. |
| (g) Habeas Corpus. | (h) Sublime Porte. |
| (i) Civil Lists. | (j) Curfew Orders. |
| (k) Conscription. | |

Ans. (a) A Blue Book. A Government publication generally. In particular British Parliamentary papers bound in blue are known as "Blue Books".

(b) The Agony Column. The portion of a newspaper devoted to advertisement of a secret or personal nature.

(c) Stop Press. News inserted (in a special blank space) in a paper at the last moment, the printing press being stopped, or kept waiting for the purpose.

(d) The Fourth Estate. The daily Press, because of the great power it wields in moulding public opinion. It was first used by Burke, in the House of Commons, pointing to the reporters' gallery.

(e) Third Degree Methods. Violent methods used by the police in examining accused persons. The methods adopted are supposed to include prolonged questioning for several hours at a stretch, deprivation of sleep, beating and torture and many other questionable methods.

(f) Sea-dog. The term is used for a sailor ; also for a pirate. It is also used for the harbour seal, and for the dog fish.

(g) Habeas Corpus. A writ directed to a person who has custody of a prisoner, ordering him to produce the prisoner before the court issuing the writ, and to explain why the prisoner is detained in custody.

(h) Sublime Porte. Official name of the court of the Sultan of Turkey before the establishment of the Republic (1922).

(i) Civil List. It is a peculiar feature of the British constitution and means the statement presented annually to Parliament showing the expenses of the Sovereign's household. In India Civil List is a publication containing the names and other details of government officials in civil employ.

(j) Curfew Order. Order issued, generally by military authorities, during riots and civil commotion to inhabitants of an area to remain within doors during specified hours, so as to localize and control the disturbances. The curfew was originally a signal, generally by ringing a bell, to cover fires and put out lights, ordered by William of Normandy as precaution against fires, for most cities were built of timber in those days.

(k) Conscription. Compulsory military service for home or national defence.

Q. 63. What do you understand by the following ? :—

- (a) Cold war. (b) Hot pursuit. (c) Neutrality.
(d) Lake Success. (e) The Hague.

Ans. (a) **Cold War** may be defined as hostility fanned between two countries or two bloc countries nominally at peace, by the battle of ideologies, while propaganda of various kind rages.

(b) **Hot Pursuit.** The relentless pursuit of enemies' armies, ships or aeroplanes. The term is also used for such pursuit of dacoits and thieves.

(c) **Neutrality** is the non-participation in war between other countries. The neutral country abstains from any interference with the war, neither favouring, nor hindering the forces of any belligerent. It must not permit the passage of belligerent forces, the establishment of bases by belligerents or the recruiting of belligerent forces in its territory.

(d) **Lake Success** is the district of Long Island, New York. It is the site of the Headquarters of the United Nations Secretariat.

(e) **The Hague** is the administrative centre and seat of the Government of the Netherlands. It is the seat of the Hague Tribunal and of the International Court of Justice.

Q. 64. What are the main changes effected in the Constitution of India by the Constitution (First Amendment) Act ?

Ans. When the Congress Government which had set its heart at abolishing the old Zamindari system and bringing about many reforms found that many clauses stood in the way of clear mandate for working out the reforms and was the cause of much litigation, it decided to make amendments in the Constitution. Thus one such amendment was that of Article 19 by which was secured the validity of laws abolishing the Zamindari system. Similarly proper restrictions on speech and expression were made in the clauses on Fundamental Rights in the interest of friendly relations with foreign Powers. Another amendment was made in Article 15 clause 4 for making special provision for the educational, social and economic advancement of backward classes.

Q. 65. Give the names of the Specialized Agencies of the United Nations which deal with the following matters :—

- (i) Labour problems.
(ii) Provision of capital for economic development.
(iii) Nutritional and consumption levels.
(iv) Exchange rates.
(v) Aviation.

Ans. (i) **Labour problems** by the I.L.O.i.e., the International Labour Organization.

(ii) **Provision of capital for economic development** by the International Bank for Reconstruction and Development.

(iii) **Nutritional and consumption levels** by the F.A.O., i.e., the Food and Agricultural Organisation.

(iv) **Exchange rates** by the International Monetary Fund.

(v) **Aviation** by the I.C.A.O. i.e., International Civil Aviation Organization.

Q. 66. What is the 'Preamble' of the Constitution of the Republic of India? Reproduce it as closely as you can in the original and if you cannot do so, give its gist.

Ans. The following is the 'Preamble' of the Constitution of India.

We, the People of India, having solemnly resolved to constitute India into a **Sovereign, Democratic Republic** and to secure to all its citizens :—

Justice, social, economic, political ;

Liberty of thought, expression, belief, faith and worship ;

Equality of status and of opportunity, and to promote among them all

Fraternity assuring the dignity of the individual and unity of the Nation ;

In our Constituent Assembly this twenty-sixth day of November, 1949, do Hereby Adopt, Enact and give to ourselves this Constitution.

Q. 67. Name the statutory bodies set up under the Constitution of the Indian Republic (a) for the dispensation of justice, (b) for control and audit of public accounts, and (c) for recruitment to Public Services.

Ans. (a) The statutory bodies set up under the Constitution of the Indian Republic for the dispensation of justice are :—

1. A Supreme Court of India consisting of a Chief Justice and seven judges of this Court (which may be increased to a larger number if Parliament by law so prescribes).

2. There is similarly a High Court for each State, with a Chief Justice at its head and such other Judges as the President may from time to time deem it necessary to appoint.

(b) For control and audit of Public Accounts, a Comptroller and Auditor General of India is appointed by the President by warrant under his hand and seal.

(c) For recruitment to Public Services, the Constitution lays down that there shall be a Public Service Commission for the Union and a Public Service Commission for each State whose chairman and other members shall be appointed in the case of the Union Commission by the President and in the case of a State by the Governor. These Public Commissions are charged with the duty of conducting examinations for appointment to the services of the Union and the services of the State respectively.

Q. 68. In what manner have the status, obligations and constitution of these bodies been codified since the Government of India Act 1935 ?

Ans. According to the Act of 1935, there had been set up a Federal Court of India consisting of a Chief Justice and other judges appointed by His Majesty in Council. All appeals from it lay to the Privy Council set up by the British Parliament. The Indian Constitution sets up a Supreme Court of India, whose Chief Justice is appointed by the Union President, with not more than seven judges for the Supreme Court. It is the final authority both for the ordinary law and for the interpretation of the Constitution. No appeal lies to anybody outside it. According to the Act of 1935, the Comptroller and Auditor General of India was appointed by His Majesty in Council and was to remain in office at his pleasure. According to the Constitution of India, though his functions are the same, and he is appointed by the President he can be removed only on an address of both Houses of Parliament on ground of (i) misconduct, and (ii) incapacity.

The Public Service Commission has the same functions and obligations under the Union as by the Act of 1935, except that it was formerly called the Federal Public Service Commission.

Q. 69. What do you understand by the following ? :—

- (a) New Deal.
- (b) Scheduled Castes and Scheduled Tribes.
- (c) Daughters of the Nile.
- (d) Darul Islam.
- (e) The Mapam.
- (f) Acceptance Speech.
- (g) Administrative Law.
- (h) Amnesty.
- (i) Statutory authorities.

Ans. (a) **New Deal.** This refers to the measures taken by President Roosevelt in the U. S. A. in 1933 to overcome the great economic crisis which broke out at the end of 1929 and to restore the social security threatened by it.

(b) **Scheduled Castes and Scheduled Tribes.** Depressed classes of people in India who suffer from social disabilities on account of untouchability and are backward socially, economically and politically are the "Scheduled Castes". The Government of India Order 1936 gives a complete list of such Scheduled Castes.

Scheduled Tribes are all those Aboriginal Tribes who, like the Scheduled Castes, are backward socially, economically and politically, though they generally do not suffer from the rigours of untouchability.

(c) **Daughters of the Nile.** Egyptian women belonging to its "liberation battalions", a trained band carrying on guerilla warfare against the British in the Suez Canal Zone in an effort to harass the British. The British, however, were too strong for such guerillas, and these therefore had no more than a nuisance value. Their necessity cease when Egypt got independence.

(d) **Darul-ul-Islam** is an outlawed and rebel Muslim armed organization in Java, which recently proclaimed an "Islamic State of Java". This fanatic religious organization is the main cause of unrest in Western and Central Java in recent years.

(e) **Mapam** is the other name of United Labour Party of the Jews of Israel. It is a party of extreme left-wing socialists. It has a considerable youth following, war heroes, and a major part of the members of the powerful collective agricultural settlements.

(f) **Acceptance Speech.** In the United States of America, the speech by which a presidential candidate nominated by the party convention accepts the nomination and outlines his programme.

(g) **Administrative Law.** By the term "Administrative Law" is meant in particular that law which determines the organization, the powers and the duties of administered bodies. But ordinarily it is used for the law administered by special tribunals, appointed by a government for special cases without reference to the ordinary courts.

(h) **Amnesty.** The act of general pardon of offenders and remission of their penalties. Most generally they are for political offenders. Thus the British Government used to give amnesty to Congress leaders whenever they came to terms with the latter and let them out of jail without binding them to any condition.

(i) **Statutory authorities.** Statutory authorities are organizations like those which control nationalized industries. They are also like Public Service Commissions, Judicial Authorities, Election Commissions, etc., created by Parliamentary statutes.

Q. 70. What do you understand by the following terms :—

- | | |
|------------------------|--------------------------|
| (a) Act of God. | (b) All Rights Reserved. |
| (c) Power of Attorney. | (d) Wall Street. |
| (e) Summons. | |

Ans. (a) **Act of God** means any result due to natural forces, unexpected and not preventible by human foresight. It may be an unforeseen calamity, not attributable to human negligence.

(b) **All Rights Reserved** are copyrights in trade marks or in publications which the owner or author reserves to himself so that he may exclusively enjoy benefits arising out of it.

(c) **Power of Attorney.** See Q. 9, part (c), under Economics.

(d) **Wall Street.** In New York it is a narrow thoroughfare which contains most of the chief banks, insurance offices, shipping offices etc. as well as the stock exchange, metal exchange and other institutions. It is thus the hub of the American financial world.

(e) **Summons** is the legal term denoting the citation to appear in court on a certain date, which is served on a person by an official of the court and which states the claim by the plaintiff or the reason for appearing in the court.

Q. 71. Give the meaning of the following :—

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|--------------------|-------------------|
| (a) Karma. | (b) Iron Curtain. |
| (c) Four Freedoms. | (d) Mandamus. |
| (e) Habeas Corpus. | |

Ans. (a) In Hindu philosophy the acts of a person which determine his future life and are responsible for births and rebirths.

(b) See Q. 51 part (d).

(c) The four freedoms according to President Roosevelt in his address to Congress in 1941 were :

1. The freedom of speech and expression.
2. The freedom of every person to worship God in his own way.
3. Freedom from want.
4. Freedom from fear.

(d) **Mandamus** is a command issued from the Bench Division of a High Court addressed to any person, corporation or inferior court requiring them to do something which appertains to their office.

(e) It is an order requiring the production in court of a person detained without trial.

Q. 72. Answer the following :—

The Constitution of India.

- (a) When did it come into force ?
- (b) How is the President elected ?
- (c) What is the duration of the President's term of office ?
- (d) What were the States which were declared Part B, Part C and Part D ?
- (e) What salaries have been fixed for :—
 - (i) The President.
 - (ii) The Governor of a State.
 - (iii) The Chief Justice.
 - (iv) Judges of the Supreme Court of India.
 - (v) The Chief Justice of a State.
 - (vi) Other judges of the high court of a State ?
- (f) What is the period fixed for making Hindi the State language ?
- (g) What is the period fixed for granting special reservation of seats to the Scheduled Castes and the Scheduled Tribes ? When will it come to an end ?

Ans. (a) The Constitution of the Republic of India came into force on January 26, 1950.

(b) When the elections to the Assemblies for Parliament and States, and the Council of States have been completed, and thereafter, the two Houses of Parliament at the Centre and the Assemblies in the States have been constituted, stage is set for the Presidential election.

Under the Constitution, the President has to be elected by an electoral college consisting of the elected members of the House of the People and the Council of States at the Centre and the elected members of the Assemblies of various States of the Union. The election is in accordance with the system of proportional representation by means of the single transferable vote and sealed ballot.

(c) Five years term.

(d) Part B States were the following :—

Hyderabad, Jammu and Kashmir, Madhya Bharat, Mysore, Patiala and East Punjab States Union, Rajasthan, Saurashtra, Travancore-Cochin and Vindhya Pradesh.

Following were Part C States :

Ajmer, Bhopal, Bilaspur, Cooh-Behar, Coorg, Delhi, Himachal Pradesh, Kutch, Manipur and Tripura.

The Andaman and Nicobar Islands and Sikkim formed Part D States.

(e) Following are the salaries of the dignitaries mentioned below :—

The President 10,000 rupees.

The Governor of a State 5,500 rupees.

The Chief Justice 5,000 rupees.

A judge of the Supreme Court 4,000 rupees.

The Chief Justice of a State 4,000 rupees.

The judge of a High Court of a State 3,500 rupees.

(j) Up to fifteen years after the commencement of the Constitution.

(g) Upto ten years from the commencement of the Constitution, after which it was to cease to have effect.

Q. 73. What are the principal provisions of the Banaras Hindu University Bill passed in 1951 ?

Ans. The principal provisions of the Bill are to bring the institution in tune with the Constitution and the recommendation of the University Commission. Henceforward religious instruction has been made optional and membership of the Court has been thrown open to persons of all communities and creeds. The Bill also removes the clauses which enabled the Government in the past to interfere in the affairs of the University. Instead of three separate entities, namely, the Visitor, the State Governor in the position of Rector and the Visiting Board, which had the right to interfere in the affairs of the University, this Bill gives these powers only to the President of the Union in the capacity of Visitor of the University.

Q. 74. Answer the following :—

(a) For what purpose was the Indian Companies (Amendment) Bill passed in 1951 ?

(b) What were the provisions of the Employees State Insurance (Amendment) Bill as passed by the Parliament in 1951.

Ans. (a) To place restrictions on the appointment, re-appointment, number of directors, their remuneration etc. of limited companies so as to curtail the power of abuse of public money by managing agents and directors of such companies.

(b) According to this Bill all employers of firms which came under the Factories Act have to contribute three-fourth per cent of the wage bill throughout the whole country as an insurance for their employees, to be given to them on their retirement or discharge from employment for various causes. In selected areas like Kanpur and Delhi, where the scheme was first enforced, the employers would have to contribute an extra $\frac{1}{2}$ per cent and in lieu thereof they are exempt from certain liabilities under the Workmen Compensation Act.

Q. 75. What, in brief, was the idea of getting the Press Bill passed in 1951? What were the safeguards specially inserted in the Bill for the possibility of an arbitrary action taken against a Press under this Bill? For what purpose has the Press (objectionable matter) Amending Bill been passed in 1954?

Ans. The object behind the Press Bill of 1951 was to deter any section of the Press from indulging in scurrilous writing or writing which tends to encourage the breakdown of law and order or encourages serious crime. The Home Minister gave out that any *bonafide* adverse criticism of the government view would not amount to interference or incitement to violence, except incitement to use unlawful physical force against any person, intimidation by exhibition of such unlawful physical force or unlawful incitement to commit sabotage.

Safeguards to prevent the executive from unnecessarily harassing the press are that there would be no precensorship of the newspapers, while the executive authority would be replaced by judicial authority which would fix the security to be demanded from a press. There would thus be no demand of any security from a press except by a judicial trial. The most salutary safeguard for any arbitrary action taken against a press would be that the Government would have to consult a law officer who would give a certificate. His grounds would then be published in papers so that his certificate has to stand the scrutiny of all concerned.

Q. 76. What are the following ? :

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|---------------------------|--------------------|
| (a) De Jure Recognition. | (b) Convention. |
| (e) Constituent Assembly. | (d) Concordat. |
| (e) Capitulation. | (f) Filibuster. |
| (g) Jim Crow Laws. | (h) Lobbying. |
| (i) Pressure Group. | (j) Straw Vote, |
| (k) Quorum. | (l) Raison D'etre, |
| (m) Entente Cordiale. | (n) Falange, |
| (o) Genocide ? | |

Ans. (a) De Jure Recognition is the formal and binding recognition by other governments of a political change in a country which has become an established fact. This government may have been formed after a successful Revolution as happened by the overthrow of the Czar by the Bolsheviks, or the Communist regime now established in China or by a change in sovereignty as when India was accepted as a Republic when it threw off the Dominion Status.

(b) Convention is an international agreement concluded between governments and not between heads of States.

This term is also used for the meeting of delegates of an American party for the nomination of candidates for office or the adoption of policy, the most important being those held to choose a candidate for the presidential election when that is due or near at hand.

(c) Constituent Assembly is the Assembly, generally, though not always, of the representatives of people to draft a Constitution, either when an old regime has been overthrown violently or a new State has been established. Thus the new Constitution of Bharat was drawn up by a Constituent Assembly.

(d) Concordat. A treaty between the Pope and a government on the relations between the Roman Catholic Church and the State, e.g., the appointment of the clergy, Church education, and taxation, the protection of Church property, State contribution to the Church etc. etc. Two well-known Concordats are those effected between Napoleon and Pope Pius VII in 1801 which lasted in France up to 1905, and that concluded by Mussolini with the Holy See in 1929.

(e) Capitulations were special treaties forced upon Asian and African States by European Powers to give their nationals special privileges and immunities. These have now disappeared almost all as a consequence of the two World Wars.

(f) Filibuster means the tactics of obstructing the passage of Bills in a legislature by endless speech making and other legitimate practices.

(g) Jim Crow Laws. Laws providing for segregation of the negroes in vehicles, places of entertainment and other public places, like the segregation laws passed in South Africa against coloured people.

(h) Lobbying. The practice of trying to canvass support for a particular measure or viewpoint by means of personal contact with the members of a legislature. This is usually done in the "lobbies" to which the public has access. Hence the term "lobbving".

(i) **Pressure Group** is a term which has a meaning almost akin to "lobbying", being applied to any group or organization which brings pressure to bear on legislators or public officials to influence legislation and policy in the interest of a section of the people.

(j) **Straw Vote.** Unofficial test poll taken by institutes or organisations engaged in the study of public opinion with a view to ascertaining the trend of public feeling. Thus Gallup Polls is one such example.

(k) **Quorum.** The minimum number of members whose presence is essential in order to constitute a house, which can lawfully transact business.

(l) **Raison D'Etre.** The interests of the state are paramount over all private morality.

(m) **Entente Cordiale.** Cordial understandings of a political nature between two governments. This term was specially coined in 1904, when England and France made a decision to collaborate with each other against German hegemony. Also France recognized British influence in Egypt, while Britain recognized French influence in Morocco. The term has been applied to subsequent Anglo-French political collaboration.

(n) **Falange** is the name given to the counter-revolutionary political movement in Spain from 1936, i.e., the beginning of the Spanish Civil War. Gen. Franco has been its head.

(o) **Genocide.** The wholesale extermination of peoples or races and measures conducive to it. This was practised with a diabolical heartlessness by the German Nazis against the Jews.

Q. 77. Answer the following :—

(a) Under the new Constitution of India what is the number of :

- (i) Members of the Upper House of Parliament.
- (ii) Members of the House of the people.
- (iii) The number of State Assemblies which choose members for the House of the People.
- (iv) The number of seats in the Assam, Bombay, Madhya Pradesh, Madras and U.P. State Assemblies respectively.
- (v) What is approximately the number of members sent to the Upper House by U.P., Madras, Bihar, Bombay, West Bengal, the Punjab and Delhi ?

(b) How many members does the President nominate to the Upper House and on what qualifications ?

(c) Is the Upper House dissolved along with the Lower House when their terms expire according to the Constitution ?

(d) What are the differences if any between the powers of the Upper House and the Lower House ?

(e) Who is the ex-officio Chairman of the Upper House ?

(f) What are the powers and functions of the Lt. Governor of Himachal Pradesh ?

Ans. (a) (i) 226.

(ii) 489.

(iii) 22.

(iv) The members are the following :

For Assam State Assembly 108, Bombay 31, Madhya Pradesh 232, Madras 375, and U.P. 497.

(v) U.P. sends to the Upper House 31 members, Madras 27, Bihar 21, Bombay 17, West Bengal 14 and Delhi 1.

(b) The President nominates 12 members of the Upper House. They are persons who have special knowledge or practical experience on literature, science, arts, and social services etc.

(b) The Upper House is not subject to dissolution, but as nearly as possible one-third of its members retire every second year, when fresh elections for the vacancies caused in the House take place and are filled.

(d) Except in the case of the Money Bills, which must be initiated in the Lower House and also passed by it in spite of any opposition of the Upper House, the Upper House enjoys almost identical powers with the Lower House.

(e) The Vice-President of India is the ex-officio Chairman of the Upper House, called the Council of States.

(f) The powers and functions of the Lt. Governor of the State are those of the two Chief Commissioners before them subject to the like control by the President as was exercisable by him over the Chief Commissioners of this State.

Q. 78. Give a summary of the main provisions in the Constitution of India which make India a secular state.

Ans. The main provisions for making India a Secular State are given under Fundamental Rights which may be stated under the following headings :—

(a) **Right to Equality.** According to this right "the State shall not deny to any person professing any creed and belonging to any

caste equality before the law or the equal protection of the laws within the territory of India."

(b) **Prohibition of Discrimination.** "The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or any of them."

"No citizen shall on grounds only of religion, race, caste, sex, place of birth or any of them, be subject to any disability, liability restriction or condition with regard to access to shops, public restaurants, hotels and places of entertainment or the use of wells, tanks, bathing ghats, roads and places of public resort maintained wholly or partly out of State funds or dedicated to the use of general public.

(c) **Equality of opportunity.** There shall be equality of opportunity for all citizens in matters relating to employment or appointment to any office under the State.

(d) **Equal protection for all.** Every person to whatever sex, creed or race he or she may belong shall have the right to freedom of speech and expression, to assemble peaceably and without arms, to form associations or unions, to move freely throughout the territory of India, to reside and settle in any part of the territory of India, to acquire, hold or dispose of property and to practise any profession, or to carry on any occupation, trade or business.

(e) **Right to freedom of religion.** This is the most essential of the Fundamental Rights which most forcibly makes India a secular State. By it: "All persons are equally entitled to freedom of conscience, and the right freely to profess, practise and propagate religion."

(f) "No religious instruction shall be provided in any educational institution wholly maintained out of State funds" so that no particular religion is favoured and encouraged by the State.

Q. 79. Write brief notes on :—

(a) **Balfour Declaration.**

(b) **Treaty of Versailles.**

(c) **Marshall Plan.**

(d) **The Nehru-Kotelawala agreement on immigration of Indians to Ceylon.**

Ans. (a) Balfour Declaration. This famous declaration was made in a letter to Lord Rothechild, chairman of the Zionist Federation, in which, in 1917, the then British Secretary, A. J. Balfour, declared that His Majesty's Government viewed with favour the establishment in Palestine of a national home for the Jewish people and would use their best endeavours to facilitate the achievement of that object,

though nothing shall be done to prejudice the civil and religious rights of non-Jewish people or the rights and political status enjoyed by Jews in other countries.

(b) The Treaty of Versailles was signed in 1919 between the Allies on the one hand and Germany on the other. According to it, Germany surrendered Alsace to France, and some other parts of its territory to Poland, Czechoslovakia, Lithuania, Belgium and Denmark. The Rhineland was demilitarized, and restrictions put on German armaments. Germany was also required to pay a large war indemnity to the Allies.

(c) Marshall Plan. See answer to Q. 41, Part (c).

(d) Nehru-Kotelawala Agreement. This was an agreement arrived at between the Prime Ministers of India and Ceylon in January 1954 over the vexed question of Indian minority in Ceylon. By this agreement Indians who have permanently settled in Ceylon were to be recognized its citizens and given representation in the legislature and all effective measures for any illegal migration of Indians to Ceylon were to be taken by the Indian Government. The Ceylon Government has not carried out the Agreement in the spirit in which it was made, for instead of regarding Indians of Ceylonese descent as its citizens like the Sinhalese, and make a common electorate of all, it has forced a separate electorate on the Indians like the baneful minority representation during the British regime which will encourage a separate mentality between the two peoples.

ECONOMICS

ECONOMICS

Q. 1. Explain what is meant by :—

(a) Deflation (b) Inflation (c) Super-Tax (d) A bull and a bear (on the stock exchange) (e) Preference shares (f) Trade mark (g) Disinflation (h) Cartel (i) Consols.

Ans. (a) Deflation. Phenomenon of falling profits, wages, incomes and employment arising out of a decrease in the supply of money and bank deposits. It may arise naturally in the course of the trade cycle or may be deliberately initiated by a government to restore the value of its currency in terms of goods, when that has been reduced by too great a volume of money.

(b) Inflation. The phenomenon that occurs when the supply of money and of bank deposits circulating through cheques etc. increases so that the community has an excess purchasing power over current production of goods at current prices and this brings about a rise in the general price level.

(c) Super Tax. The special income-tax charged on higher incomes by a government, over and above the usual income tax it charges in normal years. This was specially levied by governments on incomes which were supposed to be due to extremely high prices that suddenly shot up due to the Great War and thus business made exceptionally high profits which they got without any efforts.

(d) A bull. One who tries artificially and unduly to raise the price of stocks and speculates on a rise.

A bear. One who sells stock for delivery at a future date, anticipating a fall in price so that he may buy first at an advantage.

(e) Preference Shares. Shares on which dividends must be paid before those on any other kind or to any other party.

(f) Trade Mark. Some special sign or mark set on goods for the purpose of establishing the identity of their mark, so that competitors do not reap the high profits on similar goods that this particular mark enables its seller to earn on account of the great demand those particular goods have created.

(g) Disinflation. A reduction in the volume of money, resulting in the decrease in the demand for goods and services, thus causing a contraction of economic activity.

(h) Cartel is an association of business competitors in the

same field, formed with the object of controlling the market and creating a monopoly.

(i) **Consols** means consolidated annuities. They are public securities forming part of the national debt and consolidated into one fund.

Q. 2. Define the following terms :—

Limited Company ; trade unions; a legal tender; gold standard; sealed tender and imperial preference.

Ans. Limited Company is a company in which the liability of its shareholders is limited to the amount of their shares in it.

Trade Unions are associations of workmen and other employees for the joint promotion of their interest ; specially in relations to employers.

Legal tender. Any kind of money or currency is a legal tender in which debts can be legally paid or which freely circulates in a country.

Gold standard, A monetary system whereby bank notes are convertible into gold at a fixed rate at any time and to any extent.

Sealed tender. A tender presented to the authority which has called for it with seals on it to be opened on the day fixed for the purpose for which the tender has been given.

Imperial preference. A system, specially in the British Empire, whereby the members of that empire gave to each other preferential treatment in their tariff regulations and import quotas. The Ottawa Agreements of 1932 was of this type.

Q. 3. Explain briefly what the following terms mean :—

(1) **Exchange control** (2) **The Five Year Plan** (3) **Free Trade** (4) **Free Port.**

Ans. (1) Exchange control. Control over remittances to foreign countries which a government exercises to conserve its currency, so that it be not frittered away on imports of unessential goods.

(2) **The five year plan.** The much advertised plan of the Soviet Union for industrialization. Such a plan has become an example of national planning to achieve the aim set forth on a fixed plan and within a fixed period. We have a Five Year Plan now in India copied on this Plan.

(3) **Free Trade.** The system of unlimited international commerce without protective tariffs or any sort of discrimination against foreign goods and their free entry into the ports of the country.

(4) **Free Port.** The port in which transit of goods takes place without any custom duty on them. An example may be cited of the Polish port of Stretten, which allows Czechoslovakia to enjoy this privilege.

Q. 4. Write brief notes on :—

(1) Capitalism (2) Co-operative movement (3) A custom union (4) Stock Exchange (5) An Open Door policy (6) Indo-American technical co-operation programme.

Ans. (1) The economic system based on free enterprise and private ownership of the means of production and distribution. (2) The movement whose aim is to conduct economic activities through co-operative association in preference to the ordinary capitalistic business enterprise which it seeks to replace (3) The union of two or more states which obliterate all custom barriers among themselves and act under a joint economic system without abandoning their political independence. (4) A place where the operations of buying and selling stocks and shares are carried on. (5) The principle that trade with a country or territory should be open to every other state on equal terms and without let or hindrance of any kind whatsoever. (6) This was an agreement made between the Government of India and the U.S.A. early in 1954 under the Indo-American technical co-operation programme for economic aid involving approximately 20 million (about 10 crores). According to this the U.S.A. gives a straight dollar grant from the appropriation of \$91 million aid sanctioned for India by the U.S.A. Senate. This grant has been given expressly for the rehabilitation of Indian railways and Transport which is being carried out under India's Five-Year Plan. India is of course free to purchase locomotives and goods wagons from any country it likes.

Q. 5. What is a trade cycle ? Explain it briefly and lucidly without going into technical details.

Ans. A trade cycle is a regular succession of boom and slump that characterizes capitalism. This phenomenon may be explained in the following manner. When there is a boom, every one engaged in any production process goes on producing the articles for which there is a demand on account of the large profits made on the sale of the articles, till there is a flood of them and the market has been surfeited. As every capitalist produces on his own initiative and there is no state controlled planning, the whole production goes on haphazard and without stop, till the surfeited market refuses to take any more goods. The profits dwindle, and owing to either complete stoppage or greatly lowered demand, unemployment ensues, the investors are scared away from investing their capital and a sharp downward trend sets in till it reaches the nadir point and the goods are often cleared off at a loss, at this point upward tendency begins anew and the trade cycle gets completed.

Q. 6. What is meant by ? :—

(a) Money market (b) Bullion exchange (c) Diminishing utility (d) Increasing returns (e) Real wages

Ans. (a) Any market where the operations of bills of exchange

and of lenders and borrowers of short term loans is carried on (b) Place where transactions in coined or uncoined precious metals are being carried on. (c) A law stating that the additional benefit which a person derives from a given increase in the stock of a commodity diminishes with every increase in the stock that he already has. (d) A law stating that an increase in the amount of any factor of production will yield a more than proportionate increase in the output. (e) The amount of necessities, comforts and luxuries which the labourer can obtain for his services.

Q. 7. (a) What is the difference between the Reserve bank and ordinary banks ?

(b) What is the difference between preference shares and ordinary shares ?

(c) What is a bonus share ?

(d) What is meant by 'unfavourable balance of trade' ?

(e) What is a banker's cheque, a crossed cheque, a bearer cheque and a cheque to order.

(f) What is a letter of credit ?

(g) What is profit sharing ?

(h) What are debenture shares, ordinary shares and deferred shares ?

(i) What do you understand by Amortization of Taxes ?

(j) What is a balance sheet ?

(k) What is laissez-faire ?

Ans. (a) The points of difference between the Reserve Bank and ordinary banks are the following :—

(1) The Reserve bank is not a private shareholders' bank, while the others are. It is a State bank.

(2) It enjoys a monopoly of note issue which the other banks do not have.

(3) Being the topmost bank, it acts as the banker to other banks. No other bank is in this strong position.

(4) It acts as the banker to the government, a privilege which no other bank enjoys.

(5) It acts as the controller of credit in the country.

(6) It controls and regulates Exchanges, which other banks do not.

(7) The Reserve Bank does not pay interest on its deposits, while other banks do. Nor can it, engage directly or indirectly in trade, from which restrictions other banks are free.

(b) The difference between Preference Shares and Ordinary Shares is this that the holders of ordinary shares do not receive

any dividend until the Preference shareholders have received a certain percentage, so that in the event, if a year's trading profits being small there may only be a small sum left to share among the ordinary shareholders. If the profits are large, the Ordinary Shareholders may receive more than the holders of Preference shares.

(c) Bonus share is an extra gift or an addition to salary or wages given by a company when it makes exceptionally good profit, e.g., some insurance or banking companies not only give profit on premiums or shares to the shareholders, but also bonuses, i.e. extra profits.

(d) An unfavourable balance of trade occurs when the value of imported goods of a country exceeds that of her exports.

(e) *Banker's cheque* : Cheques drawn by banks on each other.

Crossed cheque : When a drawer puts "And Co" between two parallel lines across the face of the cheque, it is called a crossed cheque. These lines are purposely drawn for the sake of protection, for the money can only be realized through an account in a bank, therefore the risk of a stranger encashing the cheque is obviated.

A bearer cheque : A cheque payable to the person, whoever he be, who holds it, without requiring any endorsement and any witnesses that he is the proper person whose name is written on the cheque.

A cheque to order : It is a cheque on which the drawer writes the words, "or order" after the name of the drawee. The person drawing this cheque must endorse it, and produce some body known to the bank to identify him (even one of its own staff), otherwise he cannot withdraw the money.

(f) *Letters of credit*. It is a letter written by one correspondent to another requesting him to credit the bearer with a certain sum of money. It is not negotiable.

(g) *Profit sharing*. A method of remunerating labour, under which the employees receive, in addition to ordinary wages, share of the profit of the concern. It is also an important method of securing industrial peace.

(h) *Debenture shares* are the shares of a company or corporation, engaging to repay a specified borrowed sum, with interest, being payable periodically.

Ordinary shares are those which have no special privileges or rights attached to them, but which receive dividends representing the profit after paying interest on preference shares and debentures and making provision for other necessary items.

Deferred shares are shares issued by a corporation or company, entitling the holder to a gradually increasing rate of dividend

until a fixed rate is reached, when they become converted into ordinary shares.

(i) *Amortization of Taxes* : Phenomenon as a result of levying taxes on income from durable property, reducing the value of the property in question.

(j) *Balance sheet* : A statement prepared from the accounts of the concern, setting forth in the debt side the capital, its debts and other liabilities and on the credit side all the assets including cash, property, plants and so on.

(k) *Laissez-Fairie* : The theory that the State should refrain from all intervention or regulation in private industrial enterprise.

Q. 8. In what ways are the following Multi-purpose river projects likely to add to the wealth of India ?

(a) Damodar Valley Project.

(b) Bhakra Dam Project.

(c) Mahanadi Project—Hirakud Dam.

Ans. (a) *Damodar Valley Project* : This project when completed will provide perennial irrigation to three quarter of a million acres in West Bengal and generate 300,000 Kw of power both for domestic and industrial purposes. The irrigated areas are expected to give an additional income of six crores of rupees to the cultivators every year and also reduce the damage by floods.

(b) *The Bhakra Dam Project* will irrigate an area of 4.5 million acres of now practically waste land in East Punjab, by means of 200 miles of lined canals and a net-work of distributaries. It will thus help in not only adding to the wealth of this state by increased production, but convert it into a surplus state. It will also generate 160,000 Kw of electricity, which will be used for domestic and industrial purposes, and for lifting sub-soil water by means of tube wells.

(c) *The Mahanadi Project—Hirakud Dam.* The Hirakud Dam Project comprises the construction of a dam 150 feet high across the Mahanadi about 9 miles above Sambalpur in Orissa. The storage capacity of this reservoir is 5.3 million acre feet. By means of the canals on either side of it and the proposed two hydroelectric installations, an area of over one million acres of land yielding about 340,000 tons of additional food-grains and 260,000 Kw of power will be the blessing to this most backward and poorest states in India. This project will also reduce the cursed Mahanadi floods, and make it navigable to the sea.

Q. 9. What is, or are ? :—

(a) An Accommodation Bill (b) Articles of Association (c) Power of Attorney (d) Bill of Lading (e) Caution Money (f) A

Chamber of Commerce (g) A Joint Stock Company (h) A Consolidated Fund (i) Fiduciary Loan (j) Stock Exchange (k) Interim Dividends (l) Negotiable Instruments (m) Public Company (n) Sinking Fund (o) Soft Currency Area (p) Sterling area (q) Trade Cycle.

Ans. (a) A bill of exchange accepted by one person or firm for the accommodation of another persons or firm as a matter of convenience or friendship without the acceptor having received any consideration (b) These are rules and regulations detailing the scope and method of conducting the internal business of a company. They are supplementary to the Memorandum of Association (c) When by a duly signed document a person authorises another person, or his or her legal adviser, to act in all respects in his or her behalf as the agent, the agent is said to have received the Power of Attorney. (d) This is an official permit to a ship to proceed from one port to another, without making any payment for the dutiable goods it carries till these goods have been landed or stored in a bonded warehouse. (e) Money deposited as security for the fulfilment of a contract or some obligation is Security Money (f) It is an association of merchants, traders, manufacturers and people carrying on allied business which has been organised with the object of promoting the interest of trade, spreading trade information and trying to influence commercial legislation and government import and export policy etc. (g) A company having a permanent paid up share capital of a fixed amount divided into shares of fixed values. These shares are transferable and the holder's liabilities are limited to the amount of the shares. (h) Consolidated fund. This is the fund of a country's Exchequer into which is paid the revenue from customs, excise, incometax, Post office receipts and other incomes of a government. Out of this are paid salaries, allowances, pensions of judges, officials, national debt charges and other charges on the government as declared by law by Parliament. (i) Fiduciary Loan is a loan granted without any security being given. (j) Stock Exchange is the building in which the operations of buying and selling stocks and shares are carried on (k) Interim Dividends are such as are paid on shares before the time of declaring the full dividend (l) Negotiable Instrument is a form of credit, such as a bank note, cheque, debenture bond payable to bearer. or promissory note etc. which an owner may pass to another person for a consideration or cash. (m) A limited company is one whose capital consists of shares publicly subscribed, such shares being saleable by any shareholder without the knowledge and consent of other shareholders. (n) Sinking fund is a fund which a company sets apart out of its profits with the object of extinguishing its debts or loans. (o) Soft-currency area is that area, comprising a number of countries, whose currency in relation to ours is such that we have a favourable balance of trade with those countries. The currencies of those

countries is readily available. (p) The group of countries which base their international transactions upon the pound and not on gold or dollars. (q) Trade cycle : Periods of high production and employment and of low production and unemployment, called booms and slumps, make a trade cycle.

Q. 10. What do you understand by ?

Bearing the market, Bonus, Cheap money, Moratorium, Treasury bills, Loan conversion, Open Shop, Bill of Lading, Bi-metallism, ad Valorem.

Ans. Bearing the Market, is trying to produce a fall in the prices of commodity ; Bonus is an extra dividend to shareholders, or an extra gratuity paid to workmen ; when money is borrowed at a low rate of interest it is called cheap money ; moratorium is an emergency measure authorising the suspension of payments of debts for a given time ; Treasury bills are negotiable documents issued by the treasury for short term loans which may be for three, six or twelve months : the change of one kind of loans to another kind is loan conversion ; open shop in labour parlance means a shop which employs workers whether they are members of the Trade union or not, as against a closed shop which employs only union members ; *Bill of lading* is a document signed by the master of a ship in acknowledgment of goods loaded in his vessel. In this document he binds himself to deliver the articles in good condition to the persons named in the bill, certain exceptions being dully provided for. This bill is just like a railway receipt ; *Bimetalism* is the employment for coinage of two metals, usually silver and gold, which would be of fixed relative value. Gold is usually the standard metal ; while the silver coins, like copper are mere tokens. *Ad Valorem* is a term used in imposing customs duties according to the value of the goods imported. Thus if custom duties on imported cigarettes are charged ad valorem, duties per seer on the costlier varieties will be much more than on the cheaper varieties.

Q. 11. Write short explanatory notes on :—

- (a) Fiduciary Issue
- (b) Hard Currency
- (c) Devaluation
- (d) Deflation
- (e) Condominium

Ans. (a) **Fiduciary issue** is an issue of cheques or bank notes, without the provision of money reserves by the person issuing the cheque or the bank or the issuing authority.

(b) **Hard Currency** is the currency of a country in relation to which we have an adverse balance of trade or an adverse balance-

of payments and therefore scarce and difficult to obtain. Thus the dollar currencies of the U.S.A. and Canada are hard currencies for India.

(c) **Devaluation.** Devaluation is the reduction in the value of the currency of a country in terms of the currency of other. Thus India devalued her currency in terms of the dollar in 1949 and so did Great Britain and many other countries with a view to facilitate exports as it cheapens export goods in the dollar area countries.

(d) See part (a) Q. 1.

(e) **Condominium** is the joint rule of a territory by two or more states. Examples are : New Hebrides administered jointly by Britain & France. The Sudan was a condominium as it was ruled jointly by Egypt and Britain.

Q. 12. What are some of the salient features of the Banking Companies Act as amended in 1950 ?

Ans. Following are some of the features of the amendment of Companies Act 1950.

That the Reserve Bank shall have the right to inspect the account books of all the non-scheduled banks so as to ensure that they keep correct accounts on sound banking system. That they keep a certain percentage of their assets with the Reserve Bank on which the Reserve Bank might advance them loans in times of emergency.

No bank could come into existence unless 50% of the capital is paid up.

Q. 13. What do you understand by the following ?

(i) **Bilateralism.**

(ii) **Lend Lease.**

(iii) **Deflation.**

Ans. (i) **Bilateralism** is the term used for two sided agreements concluded between two parties on reciprocal basis. This is distinct from multilateral agreements which are between several parties.

(ii) **Lend-Lease** is an agreement between two governments designed to give free material aid to each other, specially in time of war or some national emergency, and to wait for a settlement till a later date. This term specially refers to such an aid provided by an act of the U. S. Congress, whereby President Roosevelt was empowered to sell, exchange, or otherwise dispose of any article of defence to any country on any term and for any purpose he chose. Thus Britain, Russia, China etc., got under this arrangement planes, ordnance, guns, bombs, ammunition, tanks, machinery, food products and what not from the U. S. A.

(iii) For Deflation see part (a) of Q. 1.

Q. 14. Write short notes on

- (i) Community Projects
- (ii) International Monetary Fund
- (iii) G. A. T. T.
- (iv) Imperial Preference
- (v) E. A. C.
- (vi) The Sterling Area and India
- (vii) The International Bank.

Ans. (i) Community Projects. These are projects which were first launched by the Union Government in Oct. 1952, spread over every state in India, from Kashmir in the north to Kerala in the South with the object of uplifting the economic condition of the whole country and with the active help of the people, most on their voluntary co-operation.

The Community projects cover a very wide field of activity. They include reclamation of virgin and waste land, provision of irrigation facilities, quality seeds, improved agricultural techniques and agricultural implements and marketing and credit facilities, establishment of cattle and sheep-breeding centres and veterinary aid posts, development of inland fisheries, reorganization of dietetics, encouragement of fruit and vegetable cultivation, afforestation, better facilities for education and housing, public health measures and better medical attention, improvement of communications and provisions of training in professional crafts. Housing is another important aspect.

It should be remembered that the community projects are not something imposed on the people by the Government. The villagers are expected to contribute their share to the fullest extent. The idea is to instil in the villager the feeling that he can forge ahead by his own effort and the Government is there not merely as a tax-gatherer or policeman, but as one who will help him in his efforts to better his lot.

To implement the scheme a specialized organization called the Community Projects Administration, has been set up by the Centre. It functions under the guidance and control of the Central Committee, which is the Planning Commission itself. The Central Committee is assisted by an Advisory Board, consisting of senior officials of the Government of India. The Community Projects Administration is also similarly assisted by a committee of officials.

At the State level, there are Development Commissioners and State Development Committees, with the Chief Ministers as Chairmen. And the key men for implementing the projects are the project executive officers. They are the officers in the field.

Non-official advice is available to the Planning Commission from the National Advisory Committee of Public Co-operation as also from the legislators from a particular project area and other representative non-officials of the area. It is yet too early to pronounce any judgement on their achievements, as the projects have had a start of a few years only since this went into progress.

(ii) **The International Monetary Fund.** This is a fund created in pursuance of the Bretton Woods Agreement made in July, 1944, with the object of stabilizing world currencies and also on international loans. This fund was fixed at \$8,000,000,000, which was mainly subscribed by the U. S. A., Great Britain, the U. S. S. R., China and France.

The Monetary Fund is chiefly concerned with the stability of the rates of exchange and with the free flow of international payments. It sees that member nations do not put restrictions on mutual payments when they are satisfied that they can maintain international payments without currency control. War debts and War damages are not dealt with by the Fund. It also advances loans to member nations, the currencies being expressed in dollars or gold.

(iii) **G. A. T. T.** is the initial for the General Agreement on Tariffs and Trade, concluded at Geneva in 1947. The object of this agreement was the removal of national restrictions on trade and the expansion of world trade on a multilateral, permanent basis, and for this purpose fair play and the gradual abolition of unfair or discriminatory trade barriers such as those which accept one country's exports at the expense of others, was sought to be enforced.

(iv) **Imperial Preference** is the trading system whereby the members of the British Commonwealth of Nations give to each other preferential treatment in their tariff regulations and import quota. The Ottawa Agreement in 1932 between Britain, the Dominions and India is an example to point.

(v) **E. A. C.** This is the initial for European Co-operation Administration established for countries receiving aid from the U. S. A. under the Marshall Plan.

(vi) **The Sterling Area** is the area consisting of those countries whose currencies are based on the British Pound Sterling. It consists of all the member Nations of the British Commonwealth of Nations except Canada and New Foundland. This area includes one-fourth of world's trade. Over 50% of export trade and 30% of the import trade of India are with the sterling area.

(vii) The International Bank has been created with the object of helping the reconstruction and development of member's (of

which are about forty-five) territories, promote private foreign investment, contribute to the long range balanced growth of trade, by promoting international investment and development and make loans also to private corporations if they cannot obtain credit elsewhere, if their governments guarantee the loans and if the Bank's experts approve the projects. The government of India has taken considerable amounts from this Bank for development of its multi-purposes projects.

Q. 15. Summarise the salient features of India's 2nd Five Year Plan under the following heads :—

- (a) The programme
- (b) The order of priorities
- (c) The targets
- (d) Finance

Ans. (a) The Programme. The ambitious programme of this Five Year Plan is to raise the country's output both in agriculture and industry, expand the existing irrigation, and power projects, carry on the various multipurpose irrigation and power projects to the ambitious targets set for them, as also expand the country's Transport and communications, so as to raise the economic level of the country according to a plan and programme. To carry out the various development schemes, during the period 1956-61, the following amounts have been envisaged to be spent in the development programme of the public section, the total for which has been fixed at Rs. 4800 crores of rupees.*

	<i>Crores</i>
1. Agriculture and community development	... 568
2. Multipurpose irrigation and power projects	... 913
3. Transport and Communication	...1385
4. Industry and Mining	... 890
5. Social Services, Rehabilitation	... 945
6. Miscellaneous	... 52

(b) The order of Priorities. Development of heavy industry gets the priority. Next come the development of transport and communication. Third place is given the Agriculture and community development etc.

(c) The Targets. We give on the next page targets for some of the selected items in this programme.

* Students may memorize approximate figures.

(a) Increase in agricultural production :

Food grains	15.4 per cent
Cotton	31 "
Oil seeds	21.73 "
Sugar cane	7.6 "
Jute	5 "

(b) Community development :

A population of 325 millions to be served through 38500 national extension centres and community projects.

Finance for the Plan.

Finances for the plan are to come from the following sources :—

	<i>Crores of rupees</i>
1. Surplus from the current Revenues	800
(a) at existing rates of taxation	350
(b) additional taxation	450
2. Borrowings from the Public	1200
(a) Market loans	700
(b) Small savings	500
3. Other Budgetary Sources	400
(a) Railway contribution to the development programmes	150
(b) Provident Funds and other Deposit Heads	959
(c) External Assistance	800
(d) Deficit Financing	1200
(e) Uncovered gap	400
Total	4800

Q. 16. Give in about 15 lines (a) the constitution and (b) an account of the work of the Planning Commission of the Government of India.

Ans. (a) The Planning Commission of the Five Year Plans consists of a National Development Council, whose chairman is the Prime Minister of India. Its other members are the Chief Ministers of the major States. Shri Gulzarilal Nanda has been specially appointed Minister in charge of Planning. He carries

out the Planning of the Scheme, in consultation with the chairman and the Chief Minister, with the assistance of the official of his ministry.

(b) The work of the Planning Commission is (i) to assess the material as well as human resources of the country, including its technical personnel and make the investigations as how best to utilize them for the Nation's advancement. (ii) It determines which schemes are to be given priorities over others and how the resources of the country are to be allocated for the completion of the schemes stage by stage. (iii) It determines the nature of machinery to be set up for the successful implementation of each stage of the plan. (iv) And last but not the least important task is to watch the progress of the Plan as it works out and make recommendation from time to time for the speedy execution of the Plan.

Q. 17. What are the chief features of the Colombo Plan ?

Ans. The chief features of the Colombo Plan are (i) The Co-operative economic development of countries of South and South East Asia, including India, Pakistan, Ceylon, Malaya, Singapore, N. Borneo and Sarawak. This plan includes large scale irrigation schemes, hydro-electric schemes, port development, river valley schemes, and other major and minor projects.

(ii) The representatives of these countries as well as those of Great Britain, Australia, New Zealand, Canada, in charge of the Colombo Plan meet from time to time to assess the requirements of the different countries and render them assistance by monetary help, by rendering them technical assistance and supply them material and machinery for carrying on the various schemes.

Thus in one of these conference Canada, the U. K., Australia and even the U. S. A. contributed as outside helpers the handsome sum of 1014 million dollars, while India offered to contribute £1,379 million, Ceylon 102 million, Malaya and British Borneo £ 107 million and Pakistan 102 million for mutual help. The plans to be worked out in 6 years of the original Plan may be renewed when the period of the Plan expires.

SPORTS

- (v) Putney Mortlake : Boat racing.
- (vi) Wimbledon : Lawn Tennis.
- (vii) Hurlingham : Polo.
- (viii) Cowes : Yacht race.
- (ix) Brooklands : Motor Racing.
- (x) Epsom : Derby.

Q. 3. (a) Which famous mountain peak was attempted to be climbed in the year 1953 and to which nationality did the mountaineers belong ? What was the result ? -

(b) Which of the following mountains have been climbed : Dhaulagiri, Everest, Kanchanjunga, Nanda Devi, Kamet, Nanga Parbat.

Ans. (a) Mt. Everest, highest of the Himalayan mountain peaks. The British Himalayan Expedition was led by Sir John Hunt. Sir Edmund Hillary and Sherpa Tensing succeeded in scaling the peak on May 29, 1953.

(b) Nanda Devi, Kamet.

Q. 4. Name some of the very well known places in England, as also in India where the following sports are held

- (a) Lawn Tennis.
- (b) Association Foot ball.
- (c) Shooting.
- (d) Polo.
- (e) Derby.
- (f) Rugby Football.

Ans. Lawn Tennis—Wimbledon.

Association Football—Wembley Stadium also, Calcutta.

Shooting—Bisley.

Polo—Hurlingham club.

Derby—Epsom.

Rugby Football—Blackheath.

Q. 5. In which games are the following used ? :—

a let ; a cannon ; a no ball ; dribble ; stymied ; seconds out ; a half nelson ; a half butt ; scrum ; creases ; volley ; wicket ; stone walling ; punt.

Ans. A let—Badminton.

A cannon—Billiards.

A no ball—Cricket.

Dribble—Football.

Stymied—Golf.

Seconds out—Boxing.

A half Nelson—Wrestling.

A half Butt—Billiards.

Scrum—Rugby Football.

Creases—Cricket.

Volley—Football.
 Wicket—Cricket.
 Stone Walling—Cricket.
 Punt—Football Rugby.

Q. 6. With what sports are the following trophies associated :—
 Ryder Cup ; Walker Cup ; The Schneider Cup ; Wightman cup ; Woodcote cup ; The Ranji Trophy ; Davis Cup ; The American Cup.

Ans. Ryder Cup—Golf.
 Walker Cup—Golf.
 The Schneider Cup—Aeroplane race.
 Wightman Cup—Tennis.
 Woodcote Cup—Car Racing.
 The Ranji Trophy—Cricket.
 Davis Cup—Lawn Tennis.
 The American Cup—Yacht Racing.

Q. 7. In which games do or did the following excel ?
 (a) Vijay Merchant. (b) Sir Don Bradman.
 (c) Dhyan Chand. (d) Ted Schroeder.
 (e) Joe Louis. (f) Amar Nath.
 (g) Hazare. (h) Vinoo Mankad.
 (i) Ezzard Charles. (j) Gordon Richards.

Ans. Vijay Merchant—Cricket.
 Sir Don Bradman—Cricket.
 Dhyan Chand—Hockey.
 Jacques Schneider—Aviation trophy.
 Joe Louis—Heavy weight boxing.
 Amar Nath—Cricket.
 Hazare—Cricket
 Vinoo Mankad—Cricket (Test Bowler).
 Ezzard Charles—Heavy weight boxing.
 Gordon Richards—Horse riding.

Q. 8. What are the dimensions of ? :—

A badminton court ; a football ground ; a lawn tennis ; polo-ground ; a pingpong table.

Ans. Badminton Court : Courts 40 ft. long and 20 ft. wide divided into 15 ft. by 10 ft.
 Football ground : The length is between 100 to 130 yards, and the breadth between 50 to 100 yards.
 Lawn Tennis : 78 feet long and 27 feet wide for single and 36 feet wide for doubles.
 Polo Ground : 300 yards long and between 150 to 200 yards wide.
 Pingpong table : 9 or 10 ft. by 5 ft.

Q. 9. In which game do the following terms occur ? :—

Scissors ; a Caddie ; Selling Plate ; Sliding Seat ; Penalty bully ; Cover Point ; Birdie ; A bout.

Ans. Scissors—Wrestling.

A caddie—Polo.

Selling Plate—Horse race.

Sliding Seat—In the Boat race.

Penalty Bully—Football.

Cover Point—Hockey.

Birdie—Golf.

A bout—Cudgels.

Q. 10. What is a Marathon race ?

When were the modern Olympic Games started ? Where have they been held and where are the next Olympic games to be held ?

What is the game in which India has maintained the world championship in three successive Olympiads ?

Ans. Marathon Race. Race of 25 miles 385 yards included in Olympic games in memory of Pheidippides, an Olympic Champion runner, who ran from Marathon to convey the news of victory to Athens (490 B.C.)

The modern Olympic Games were started in 1894. The following are the places at which they have been held :

1. Athens 1896.
2. Paris 1900.
3. St. Louis 1904.
4. London 1908.
5. Stockholm 1912.
6. Antwerp 1920.
7. Paris 1924.
8. Amsterdam 1928.
9. Los Angeles 1932.
10. Berlin 1936.
11. London 1948.
12. Helsinki 1952.
13. Melbourne (Australia) 1956.

The next Olympic games are to be held in Rome in 1960.

India has maintained championship in hockey.

Q. 11. (i) State the length of a cricket pitch.

(ii) The height of a tennis net.

(iii) The number of squares in a chess-board.

(iv) The number of pieces used in a game of chess.

- Ans.**
1. Length of a cricket pitch is twenty-two yards between the opposite wickets.
 2. Height of tennis net is three feet at the centre.
 3. Number of squares in a chess-board is sixty-four.
 4. Number of pieces used in a game of chess is thirty-two.

Q. 12. With what games do you associate the following :

- | | |
|-----------------|----------------|
| (a) Dicher. | (b) Checkmate. |
| (c) Punt. | (d) Links. |
| (e) Touch Line. | (f) Revoke. |
| (g) The Ropes. | (h) Gambet. |

Ans. (a) Dicher—Game of Bowls.
 (b) Checkmate—Game of Chess.
 (c) Punt—Association Football ; Rugby.
 (d) Links—Golf.
 (e) Touch Line—Association Football.
 (f) Revoke—Cards.
 (g) The Ropes—Bowles.
 (h) Gambet—Chess.

Q. 13. How many players are there on each side in the following games ?

- | | |
|-----------------------|----------------------------|
| (i) Cricket. | (ii) Association Football. |
| (iii) Rugby Football. | (iv) Polo. |
| (v) Hockey. | (vi) Water Polo. |
| (vii) Lawn Tennis. | (viii) Base-Ball. |

Ans. (i) Cricket—Eleven players on each side.
 (ii) Association Football—Eleven players on each side.
 (iii) Rugby Football—Fifteen players on each side.
 (iv) Polo—Four on each side.
 (v) Hockey—Eleven players on each side.
 (vi) Water Polo—Seven on each side.
 (vii) Lawn Tennis—One or two couples.
 (viii) Base-Ball—Nine players form a team.

Q. 14. Write short notes on the following :—

The Derby ; the Davis Cup ; The Ranji Trophy ; The Schneider Cup.

Ans. The Derby. Most important horse race in England. Takes place on the 22nd day of the summer meeting at Epsom (London), usually in May, but sometimes in June. It is so called because it was started by the 12th Earl of Derby in 1780. It is competed for by three years old colts and fillies. The winner receives a sum of not less than £5,000.

The Davis Cup. A lawn tennis trophy competed for internationally. This cup was presented by F. Davis, an American player, in 1900. It is a knock-out tournament for men ; consists of four matches of five sets of singles, and one doubles match of five sets, the winners being best of the five matches.

Ranji Trophy. Cricket trophy in honour of Sri Kumar Ranjitsinhji Maharaja of Nawanagar, a brilliant batsman, who played cricket for Sussex and for England against Australia in 1897-8 and 1899.

Schneider Cup. An aviation trophy presented by Jacques Schneider in 1933 for competition between aeroplanes of any nation.

ABBREVIATION

PAPERS SET IN VARIOUS COMPETITIVE EXAMINATIONS ON ABBREVIATION

Q. 1 What do the following abbreviations stand for ?

N.C.C., F.B.A., A.R.P., C.I.G.S., D.P.H., I.A.S., l.b.w., P.S., C.A., I.P.S.

(Military College Exam. 1957)

Ans. N.C.C.	National Cadet Corps.
F.B.A.	Fellow of British Academy
A.R.P.	Air Raid Precautions.
C.I.G.S.	Chief of the Imperial General Staff.
D.P.H.	Diploma in Public Health ; Department of Public Health.
I.A.S.	Indian Administrative Service.
l.b.w.	Leg Before Wicket.
P.S.	Post Script.
Y.M.C.A.	Young Men Christian Association.
I.P.C.,	Iraq Petroleum Company Indian Penal code

Q. 2. What do the following abbreviations stand for ? :—

(a) O.C. ; (b) Lt. Col. ; (c) N.C.O. ; (d) N.C.C. ; (e) I.A.F. ; (f) P.T. ; (g) A.I.R. ; (h) B.C.C. (i) G.M.T. ; (j) I.S.T. ; (k) I.A.S. ; (l) I.P.S. ; (m) P.T.O. ; (n) L.B.W. ; (o) M.C.C.

(Military College Exam. 1957)

Ans. (a) O.C.	Officer Commanding
(b) Lt. Col.	Lieutenant Colonel
(c) N.C.O.	Non Commissioned Officer
(d) N.C.C.	National Cadet Corps
(e) I.A.	Indian Air Force
(f) P.T.	Physical Training
(g) A.I.R.	All India Radio
(h) B.B.C.	British Broadcasting Corporation
(i) G.M.T.	Greenwich Mean Time.
(j) I.S.T.	Indian Standard Time
(k) I.A.S.	Indian Administrative Service
(l) I.P.S.	Indian Police Service
(m) P.T.I.	Press Trust of India
(n) L.B.W.	Leg before wicket
(o) M.C.C.	Marylebone Cricket Club.

ABBREVIATIONS

Q. 1. What do the following abbreviations stand for :—

C.I.D. ; U.S.S.R. ; V.C. ; O.B.E. ; A.I.R. ; e.g., N.C.O. ;
S.O.S. ; G.C. ; C.P.R. ; B.B. & C.I.R. ; A.D.C. ; M.G.B. ;
E. & O.E. ; M.C.C.

Ans.

C.I.D. Criminal Investigation Department ; Committee of
Imperial Defence.
U.S.S.R. Union of Soviet Socialist Republics.
V.C. Victoria Cross, Vice-Chancellor, Vice-Consul.
O.B.E. Officer of the Order of the British Empire.
A.I.R. All India Radio.
e.g. *Exempli gratia* = For example.
N.C.O. Non Commissioned Officer.
S.O.S. Save our souls (wireless signal of distress at sea).
G.C. George Cross.
C.P.R. Canadian Pacific Railway.
B.B. & C.I.R. Bombay Baroda, and Central India Railway.
A.D.C. Aide-de-Camp, Amateur Dramatic Club.
M.G.B. Machine Gun Brigadier.
E. & O.E. Errors and omissions excepted.
M.C.C. Marylebone Cricket Club.

Q. 2. What do the following abbreviations stand for :—

(i) B.B.C., (ii) D.S.O., (iii) F.R.S., (iv) F.R.C.S., (v) K.C.,
(vi) P.C., (vii) K.G., (viii) O.M., (ix) P.M., (x) I.N.

Ans.

(i) B.B.C. British Broadcasting Corporation.
(ii) D.S.O. Distinguished Service Order.
(iii) F.R.S. Fellow of Royal Society.
(iv) F.R.C.S. Fellow of the Royal College of Surgeons.
(v) K.C. King's Counsel ; King's College.
(vi) P.C. Privy Counsellor.
(vii) K.G. Knight of the Garter.
(viii) O.M. Order of Merit.
(ix) P.M. Prime Minister, Post Meridien = Afternoon.
(x) I.N. Indian Navy.

Q. 3. For what do the following abbreviations stand :—

I.A.S.C. ; O.B.E. ; R.S.V.P. ; Y.W.C.A. ; G.O.C. ; Mss. ;
I.A.F. ; A.F.I. ; I.F.A. ; an AB ; P.E.N. ; A.R.P. ; R.S.S. ;
T.N.T.

Ans.

I.A.S.C.	Indian Army Service Corps.
O.B.E.	Order of British Empire.
R.S.V.P.	Please reply (Repondez si'l vous plait).
Y.W.C.A.	Young Women's Christian Association.
G.O.C.	General Officer Commanding.
Mss.	Manuscript.
I.A.F.	Indian Air Force.
A.F.I.	Air Force Institute.
I.F.A.	Indian Football Association (Calcutta).
an AB.	an able-bodied (seaman).
P.E.N.	International Club of Poets, Playwrights, Editors, Essayists and Novelists.
A.R.P.	Air Raid Precautions.
R.S.S.	Rashtriya Swayam Sewak Sangh.
T.N.T.	Tri-nitrotoluene.

Q. 4. What do you think is the occupation and profession of a person on whose name-plate you see, after his name, these letters :—

F.R.C.S. ; R.E.S. ; R.I.N. ; M.R.C.V.S. ; M.A.L. ; I.A.F. ;
LL.B. ; I.A.S. ; M.D. ; S.E.A.T.O.

Ans.

F.R.C.S.	Fellow of the Royal College of Surgeons (A Doctor).
R.E.S.	River Emergency Service, Royal Empire Society.
R.I.N.	Royal Indian Navy (A sailor or captain etc.)
M.R.C.V.S.	Member of the Royal College of Veterinary Surgeons.
M.A.L.	Member Anthropological Institute (A research scholar or scientist).
I.A.F.	Indian Air Force (A pilot or one in the service of the Indian Air Force).
LL.B.	<i>Legum Baccalaureus</i> = Bachelor of Laws (A lawyer).
I. A. S.	Indian Administrative Service (one carrying on some high administrative duty).
M. D.	Doctor of Medicine (A Doctor).
S.E.A.T.O.	South-East Asia Treaty Organization.

Q. 5. Explain the following abbreviations :—

(a) U.N.E.S.C.O.	(b) I.L.O.
(c) I.L.P.	(d) ad lib.
(e) H.E.H.	(f) l.b.w.
(g) F.A.O.	(h) I.N.T.U.C.
(i) O.M.	(j) I.N.A.

Ans.

- (a) U.N.E.S.C.O. United Nations Educational, Scientific and Cultural Organisation.
 (b) I.L.O. International Labour Organisation.
 (c) I.L.P. Independent Labour Party.
 (d) ad lib. As much as desired (*L. ad libitum*).
 (e) H.E.H. His Exalted Highness.
 (f) l.b.w. Leg before wicket.
 (g) F.A.O. Food and Agricultural Organisation.
 (h) I.N.T.U.C. Indian National Trade Union Congress.
 (i) O.M. Order of Merit.
 (j) I.N.A. Indian National Army.

Q. 6. What do these initials stand for :—

C.H. ; P.C. ; A.V.D. ; R.A.A.F. ; W.R.N.S. ; K.C.B. ;
 Q.E.D. ; L.S.D. ; K.C.M.G. ; E.P.T. ; S.P.C.A. ; I.R.A. ;
 K.T. ; M.G.O. ; S.R.M. ; U.S.A. ; W.I. ; T.V.A. ; G.I. ;
 anon ; ad inf. ; Cantab ; c.f. ; C.C.I.

Ans.

- C.H. Companion of Honour.
 p.c. per cent.
 A.V.D. Army Veterinary Department.
 R.A.A.F. Royal Australian Air Force.
 W.R.N.S. Women's Royal Naval Service.
 K.C.B. Knight Commander of the Bath.
 Q.E.D. Which was to be proved (*Quod erat demonstrandum*).
 L.S.D. Pounds, shillings, pence.
 K.C.M.G. Knight Commander, Order of St. Michael and St. George.
 E.P.T. Excess Profits Tax.
 S.P.C.A. Society for Prevention of Cruelty to Animals.
 I.R.A. Irish Republican Army.
 K.T. Knight of the Order of the Thistle.
 M.G.O. Machine Gun Officer.
 S.R.M. Sorter Railway Mail.
 U.S.A. United States of America.
 W.I. Women's Institute, West Indies, West Indian.
 T.V.A. Tennessee Valley Authority.
 G.I. Governmental Issue. American soldiers humorously adopted this term to themselves and began calling themselves G.I.
 anon. Anonymous.
 ad inf. *ad infinitum*=To infinity.
 Cantab *Cantabrigensis*=of Cambridge.
 c. f. chaplain to the forces.
 C.C.I. Cricket Club of India.

Q. 7. Following initials stand for certain former railways in India. State what were the full designations of these railways :—

G.I.P. Rly. ; B.N. Rly. ; S.I. Rly. ; K.S. Rly. ; J. Rly. ; B.B. & C.I. Rly. ; N.W. Rly. ; B. and A. Rly. ; O. and T. Rly.

Ans.

G.I.P. Rly.	Great Indian Peninsular Railway.
B.N. Rly.	Bengal Nagpur Railway.
S.I. Rly.	South Indian Railway.
K.S. Rly.	Kalka Simla Railway.
J. Rly.	Jodhpur Railway.
B.B. & C.I. Rly.	Bombay Baroda and Central India Railway.
N.W. Rly.	North Western Railway.
B. & A. Rly.	Bengal and Assam Railway.
O. & T. Rly.	Oudh and Tirhut Railway.

Q. 8. What do the following stand for :—

(a) W.H.O. (b) U.S.S.R. (c) R.S.V.P. (d) Protem (e) I. Q.
(f) C-in-C. (g) I.M.F. (h) I.O.U. (i) J.P. (j) Ibid.

Ans.

(a) W.H.O.	World Health Organisation.
(b) U.S.S.R.	United States of Soviet Republics.
(c) R.S.V.P.	Reply if you please (<i>Fr. Repondez s'il vous plait</i>).
(d) pro tem	for the time being.
(e) I.Q.	Intelligence Quotient.
(f) C-in-C.	Commander-in-Chief.
(g) I.M.F.	International Monetary Fund.
(h) I.O.U.	I owe you.
(i) J.P.	Justice of the Peace.
(j) Ibid	In the same place (<i>L. ibidem</i>).

Q. 9. Give the Arabic numeral equivalents of :—

CM ; CCC ; MD ; XCX ; MCMXL ; XXXXI ; LXXXV ;
MCC ; MM.

Ans.

CM.	900.
CCC.	300.
MD.	1,500.
XCX.	100.
MCMXL.	1,940.
XXXI.	31.
LXXXVII.	87.
MCC.	1200.
MM.	2000.

Q. 10. The following abbreviations are meant for a special type of service in India. Which is that service and what do they designate in full :—

F.A.A. ; Cpl. ; Cde. ; Sgt. ; P.O.W. ; A.F.S. ;
N.S.P.C.C. ; O.C. ; I.A.F. ; G.H.Q. ; Bty. ; Batt. ;
A.G. ; A.A.F. ; A.M.C. ; Adam. ; A.V. ; T.T.

Ans.

F.A.A.	Fleet Air Arm.
Cpl.	Corporal.
Cde.	Commodore.
Sgt.	Sergeant.
P.O.W.	Prisoner of War.
A.F.S.	Auxiliary Fire Service.
N.S.P.C.C.	National Society for the Prevention of Cruelty to Children.
O.C.	Officer Commanding.
I.A.F.	Indian Air Force.
G.H.Q.	General Headquarters.
Bty.	Battery.
Batt.	Battalion.
A.G.	Adjutant General.
A.A.F.	Auxiliary Air Force.
A.M.C.	Armed Merchant Cruiser.
Adm.	Admiral.
A.V.	Artillery Volunteers.
T.T.	Telegraph Transfers, Tourist Trophy, Teetotal.

Q. 11. What do the following abbreviations stand for :—

(a) A.M.	(b) P.M.
(c) Avdp.	(d) Amp.
(e) X.	(f) S.O.S.
(g) I.C.A.R.	(h) C.W.I.N.C.
(i) T.V.A.	(j) U.N.E.S.C.O.

Ans.

(a) A.M.	Air Ministry.
(b) P.M.	Prime Minister, <i>post meridiem</i> = afternoon.
(c) Avdp.	avoirdu pois.
(d) Amp.	ampere.
(e) X	Christ, ten.
(f) S.O.S.	Save our souls (distress signal at sea).
(g) I.C.A.R.	Indian Council of Agricultural Research.
(h) C.W.I.N.A.	Central Water Power, Irrigation and Navigation Commission.
(i) T.V.A.	Tennessee Valley Authority.
(j) U.N.E.S.C.O.	United Nations, Educational, Scientific and Agricultural Organization.

Q. 12. For what do the following groups of letters stand ?

- | | |
|------------|------------|
| (a) C.I.D. | (b) C.O.D. |
| (c) f.o.b. | (d) f.o.r. |
| (e) G.H.Q. | (f) i.e. |
| (g) I.O.U. | (h) S.O.S. |
| (i) I.L.O. | (j) W.H.O. |

Ans.

- | | |
|------------|--|
| (a) C.I.D. | Criminal Investigation Department. |
| (b) c.o.d. | Cash on delivery ; central ordnance department. |
| (c) f.o.b. | free on board. |
| (d) f.o.r. | free on rail. |
| (e) G.H.Q. | General Headquarters. |
| (f) i.e. | that is (L. id. est.) |
| (g) I.O.U. | I owe you. |
| (h) S.O.S. | Save our souls (signal of distress on board ship). |
| (i) I.L.O. | International Labour Organization. |
| (j) W.H.O. | World Health Organization. |
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